US006186794B1

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Brown et al.

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(45) **Date of Patent: Feb. 13, 2001**

(54) **APPARATUS FOR INTERACTIVE ADAPTIVE LEARNING BY AN INDIVIDUAL THROUGH AT LEAST ONE OF A STIMULI PRESENTATION DEVICE AND A USER PERCEIVABLE DISPLAY**

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(73) Assignee: **Breakthrough to Literacy, Inc.**, Bothell, WA (US)

(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **08/041,541**

(22) Filed: **Apr. 2, 1993**

(51) **Int. Cl.**[7] **G06K 9/00**
(52) **U.S. Cl.** ..... **434/116**; 434/118; 434/169; 434/307 A; 704/271; 340/825.19
(58) **Field of Search** 434/118, 156, 434/157, 167, 168, 178, 185, 236, 238, 758, 307, 308, 322, 323, 365; 364/419.01, 419.02, 419.03, 419.07, 419.08, 419.1, 419.2; 395/100, 118, 152, 275, 375, 500, 155, 161, 600, 927, 575, 425; 704/1, 2, 3, 7, 258, 260, 270, 271; 706/927; 345/302, 952, 825.25; 340/825.19, 825.22, 825.25

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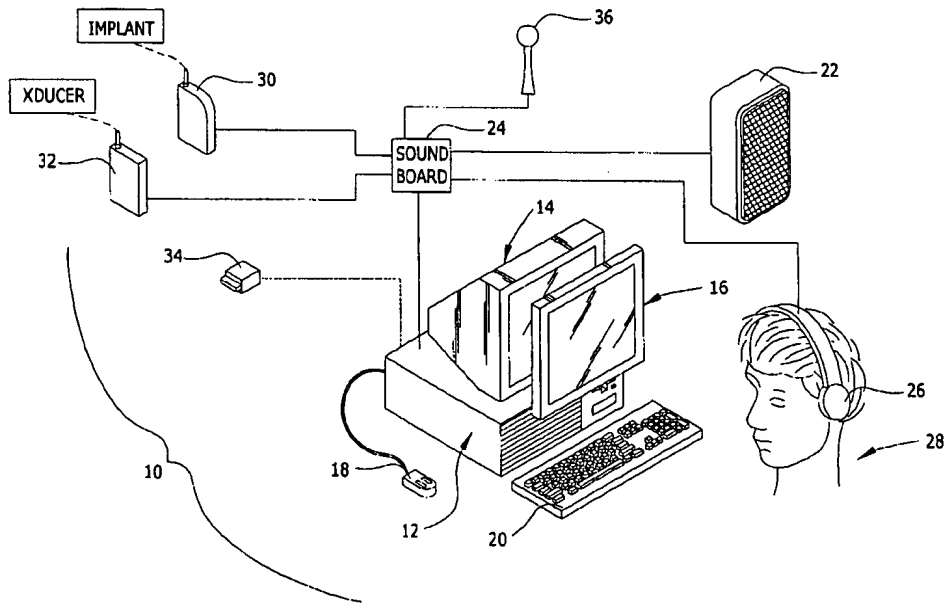
(57) **ABSTRACT**

An interactive adaptive learning system. A collection of core stimuli consisting of at least auditory and visual symbols and information, are stored on a computer. A number of different relationships between the core stimuli are created which can then be presented as discrimination or identification tasks to the user. Different sets of stimuli are then presented succeedingly to the user and the user is requested to respond. The form of response can either be to investigate and analyze the stimuli, or attributes of the stimuli, or answer of the quarry regarding the discrimination or identification task. The system has a built in strategy for progressing the user through learning tasks. The users actions and responses in reaction to the stimuli are all recorded and analyzed. Based not only on the success rate of the user responses, but also on other characteristics of the users reaction to the stimuli, the users learning strategy is classified. This classification is then utilized to either allow the learning strategy to continue as initially set, or to dynamically adjusted to find the presently indicated level of difficulty for the user or to adapt to the users particular learning strategies or needs.

1 Claim, 46 Drawing Sheets



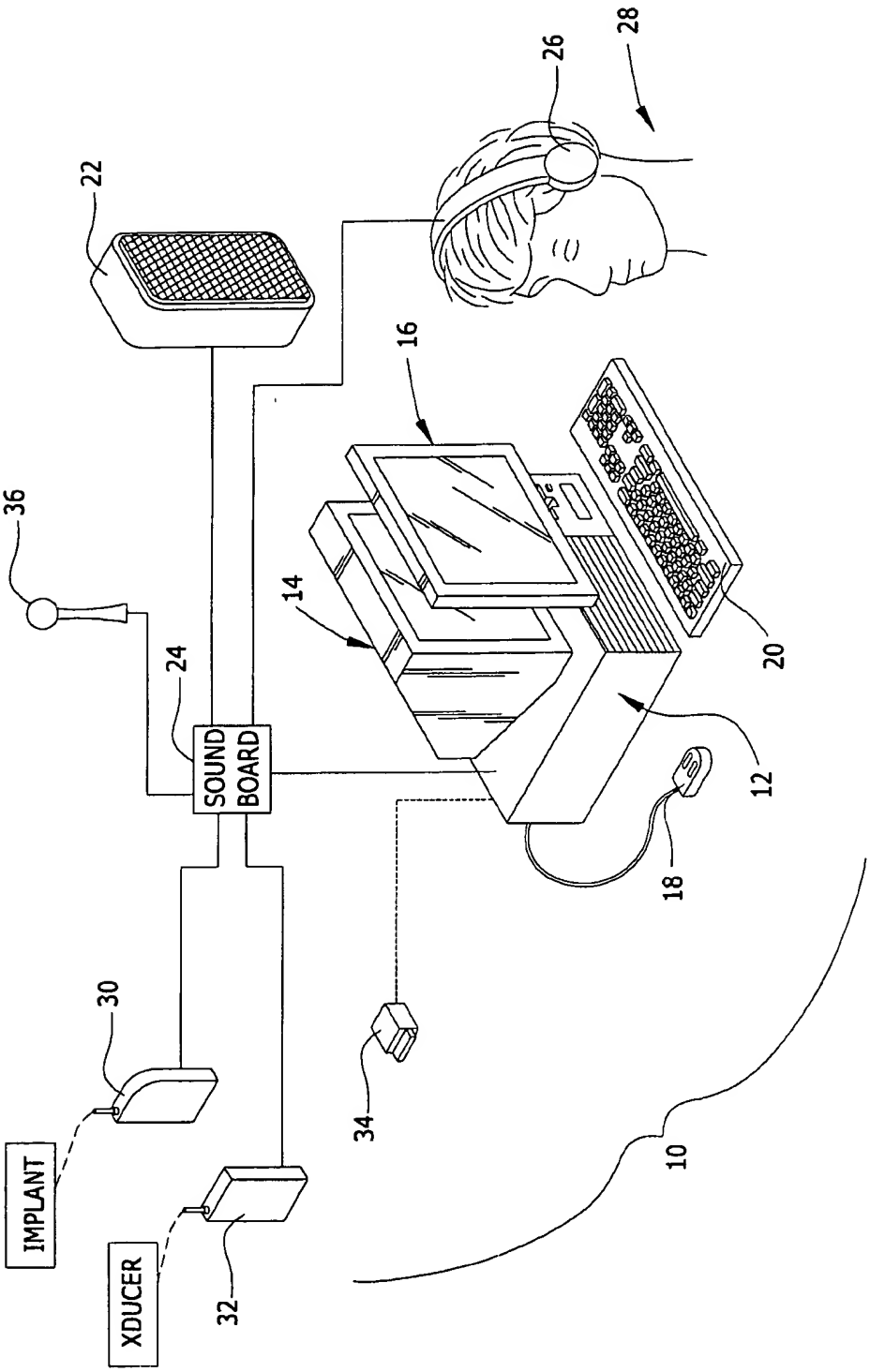

22
26
28
16
36
14
24
20
SOUND BOARD
12
18
30
34
10
IMPLANT
XDUCER
32

Fig. 1

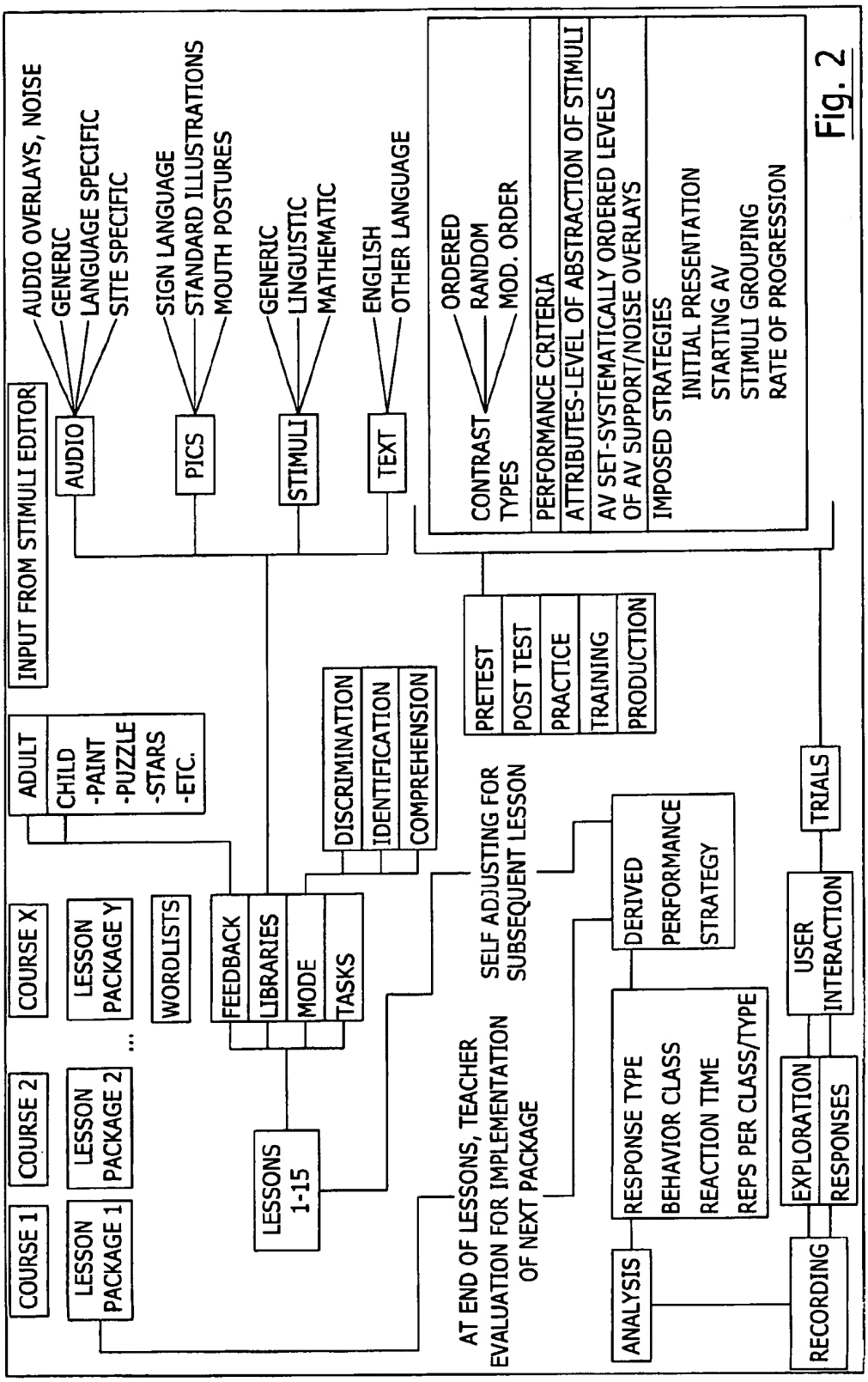

INPUT FROM STIMULI EDITOR
AUDIO
AUDIO OVERLAYS, NOISE
GENERIC
LANGUAGE SPECIFIC
SITE SPECIFIC
PICS
SIGN LANGUAGE
STANDARD ILLUSTRATIONS
MOUTH POSTURES
STIMULI
GENERIC
LINGUISTIC
MATHEMATIC
TEXT
ENGLISH
OTHER LANGUAGE
CONTRAST TYPES
ORDERED
RANDOM
MOD. ORDER
PERFORMANCE CRITERIA
ATTRIBUTES-LEVEL OF ABSTRACTION OF STIMULI
AV SET-SYSTEMATICALLY ORDERED LEVELS OF AV SUPPORT/NOISE OVERLAYS
IMPOSED STRATEGIES
INITIAL PRESENTATION
STARTING AV
STIMULI GROUPING
RATE OF PROGRESSION
ADULT
CHILD
-PAINT
-PUZZLE
-STARS
-ETC.
COURSE 1
COURSE 2
COURSE X
LESSON PACKAGE 1
LESSON PACKAGE 2
LESSON PACKAGE Y
WORDLISTS
FEEDBACK
LIBRARIES
MODE
TASKS
DISCRIMINATION
IDENTIFICATION
COMPREHENSION
PRETEST
POST TEST
PRACTICE
TRAINING
PRODUCTION
LESSONS 1-15
SELF ADJUSTING FOR SUBSEQUENT LESSON
AT END OF LESSONS, TEACHER EVALUATION FOR IMPLEMENTATION OF NEXT PACKAGE
DERIVED PERFORMANCE STRATEGY
RESPONSE TYPE
BEHAVIOR CLASS
REACTION TIME
REPS PER CLASS/TYPE
ANALYSIS
RECORDING
EXPLORATION
RESPONSES
USER INTERACTION
TRIALS

Fig. 2

PROGRAM PROCESS

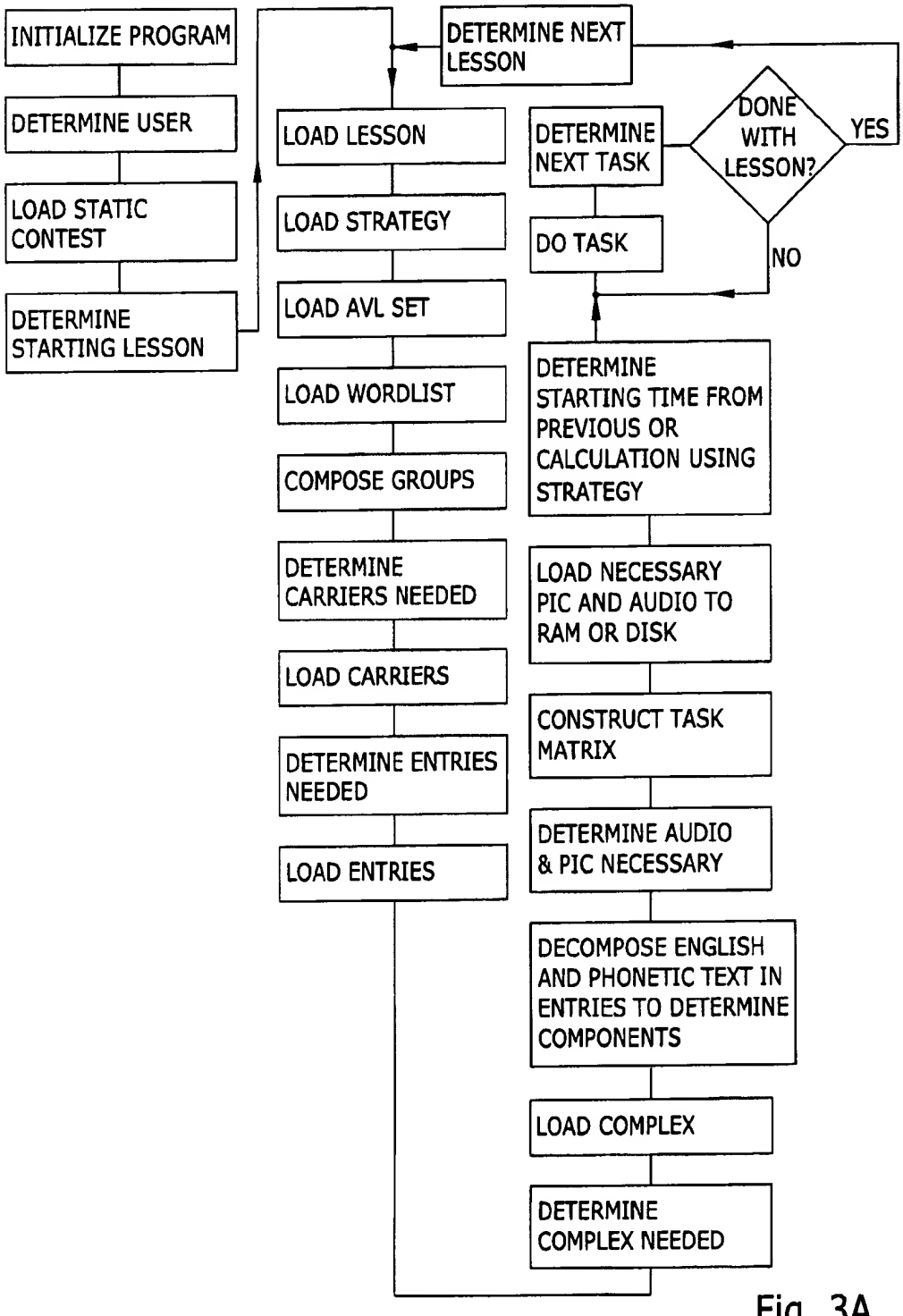


Fig. 3A

DO TASK

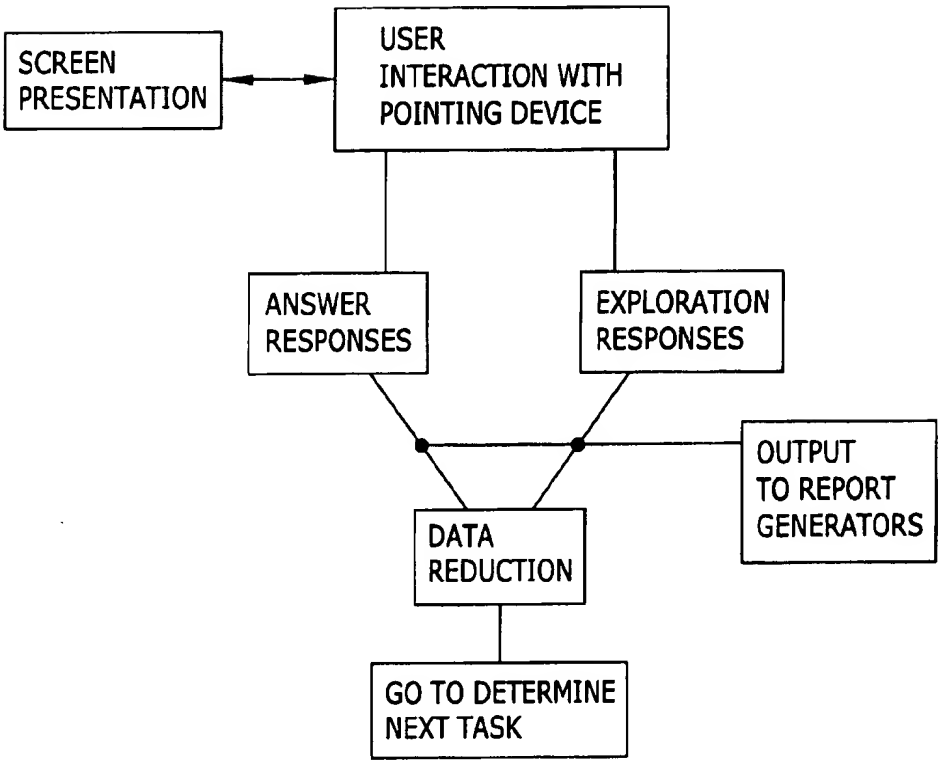


Fig. 3B

DONE WITH LESSON

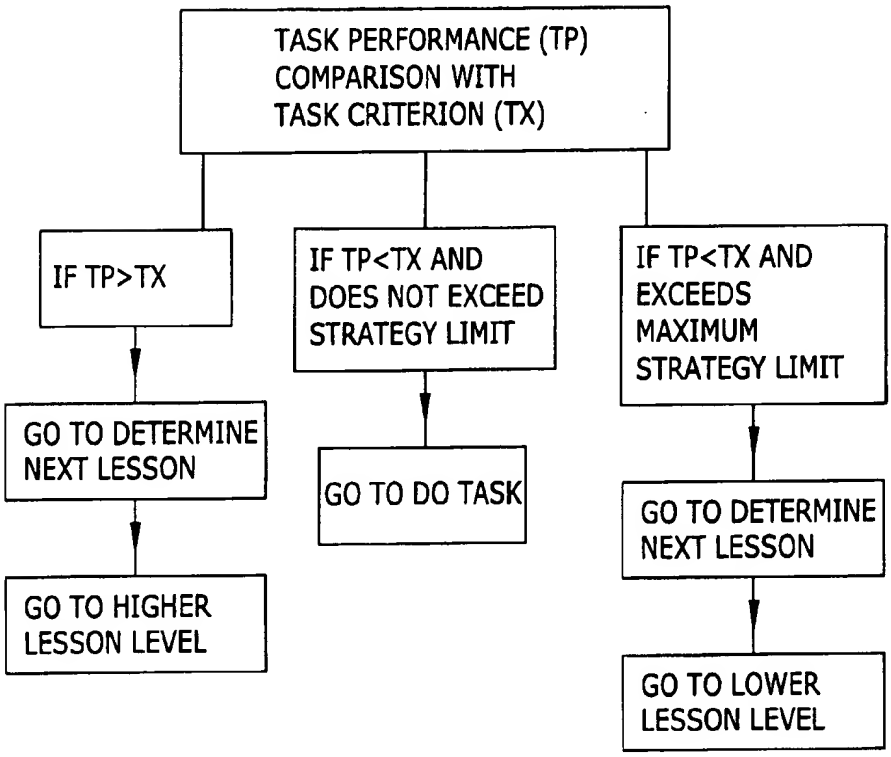


Fig. 3C

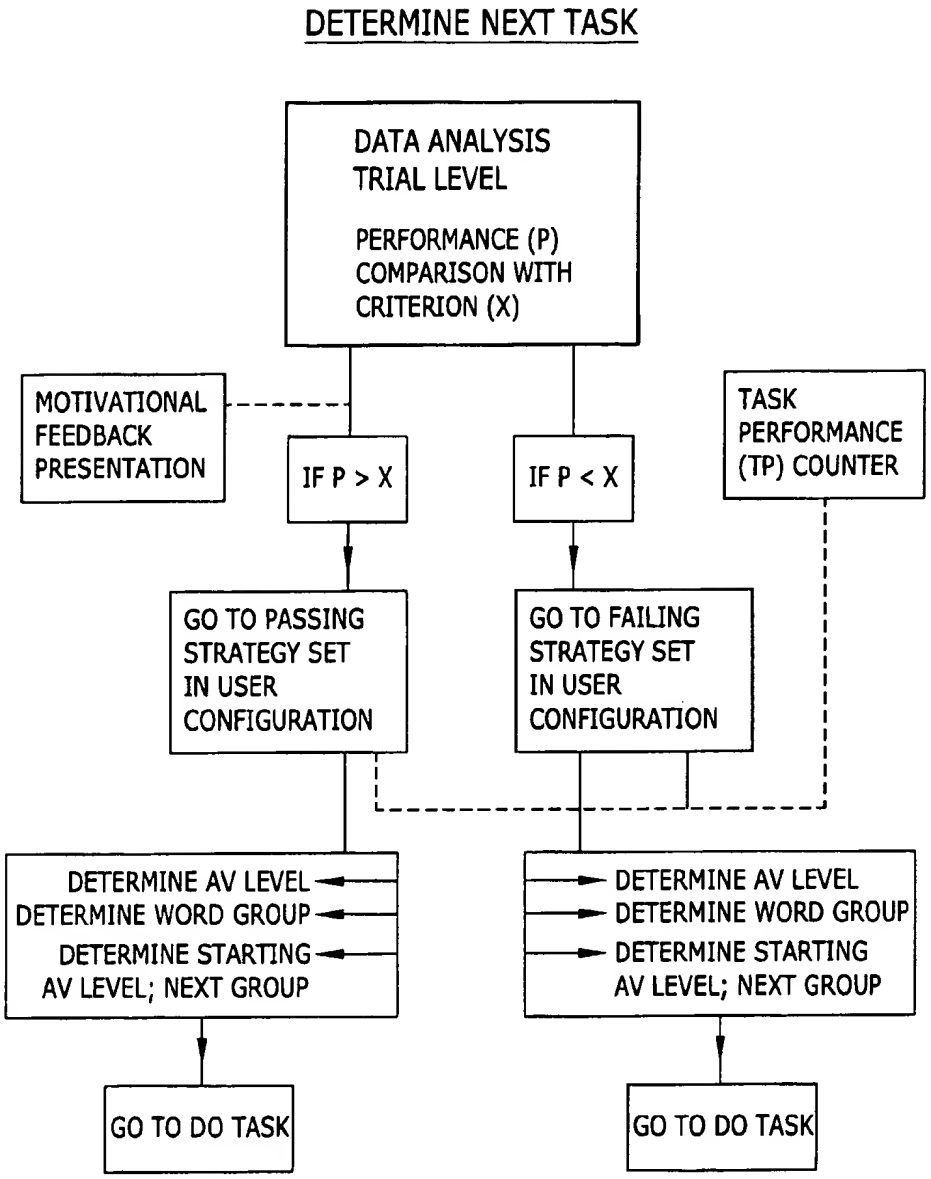
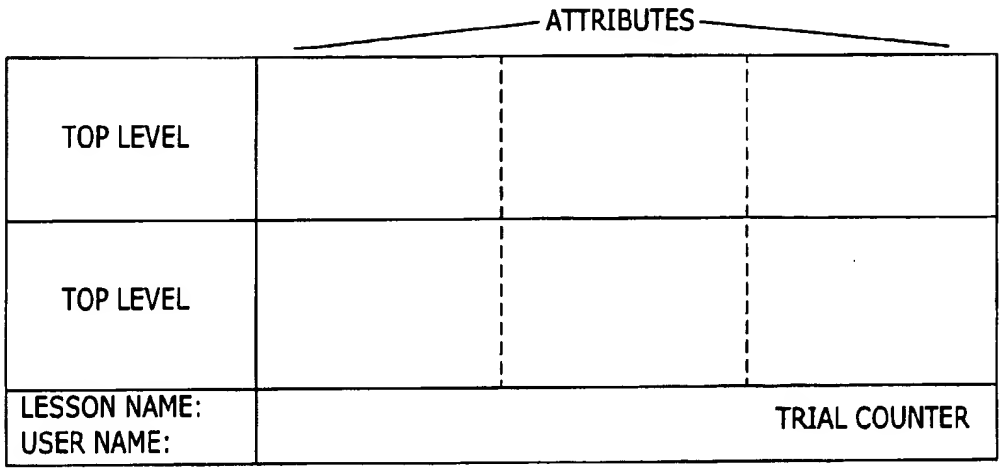
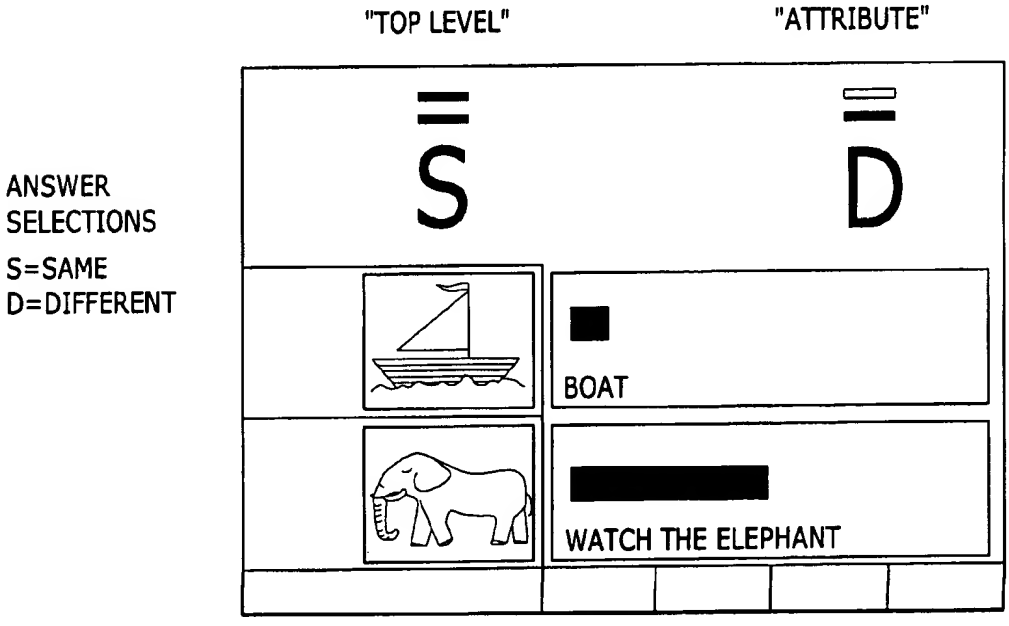

DETERMINE NEXT TASK
DATA ANALYSIS
TRIAL LEVEL
PERFORMANCE (P)
COMPARISON WITH
CRITERION (X)
MOTIVATIONAL
FEEDBACK
PRESENTATION
IF P > X
IF P < X
TASK
PERFORMANCE
(TP) COUNTER
GO TO PASSING
STRATEGY SET
IN USER
CONFIGURATION
GO TO FAILING
STRATEGY SET
IN USER
CONFIGURATION
DETERMINE AV LEVEL
DETERMINE WORD GROUP
DETERMINE STARTING
AV LEVEL; NEXT GROUP
DETERMINE AV LEVEL
DETERMINE WORD GROUP
DETERMINE STARTING
AV LEVEL; NEXT GROUP
GO TO DO TASK
GO TO DO TASK

Fig. 3D



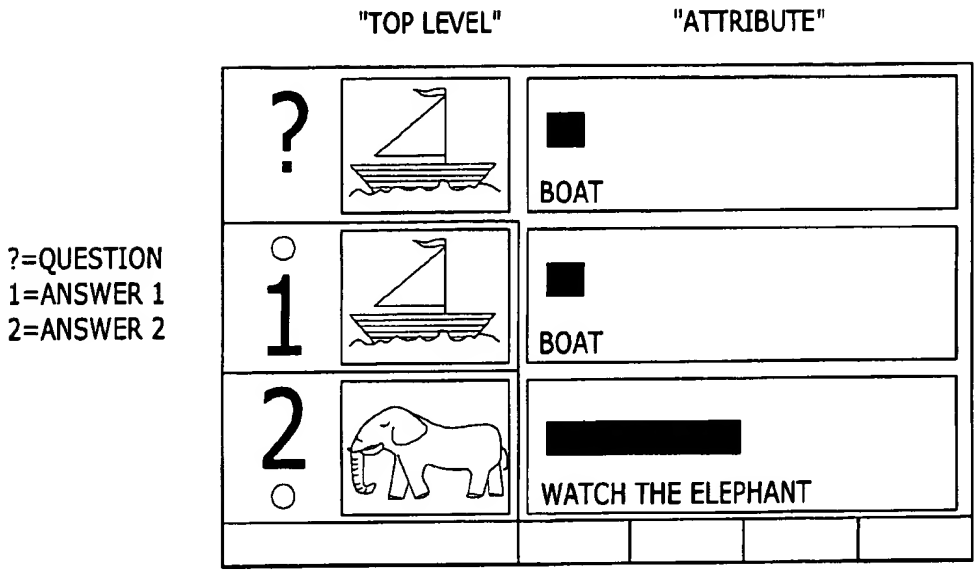
SCREEN DISPLAY, TRAINING TASKS

Fig. 4A



DISCRIMINATION TASK

Fig. 4B



IDENTIFICATION TASK

Fig. 4C

TITLE = 1 SYL, MIXED FREQ V. 3 SYL, MIXED FREQ
SET = 1 SYL, MIXED FREQ
SET = 3 SYL, MIXED FREQ

CUP	:	DINOSAUR
MEAT	:	GORILLA
BROOM	:	CEREAL
SHOE	:	BASKETBALL
COW	:	FINGERPAINT
CHEESE	:	HULA-HOOP
DOG	:	CALENDAR
STAR	:	BANANA

WORD LIST

Fig. 5

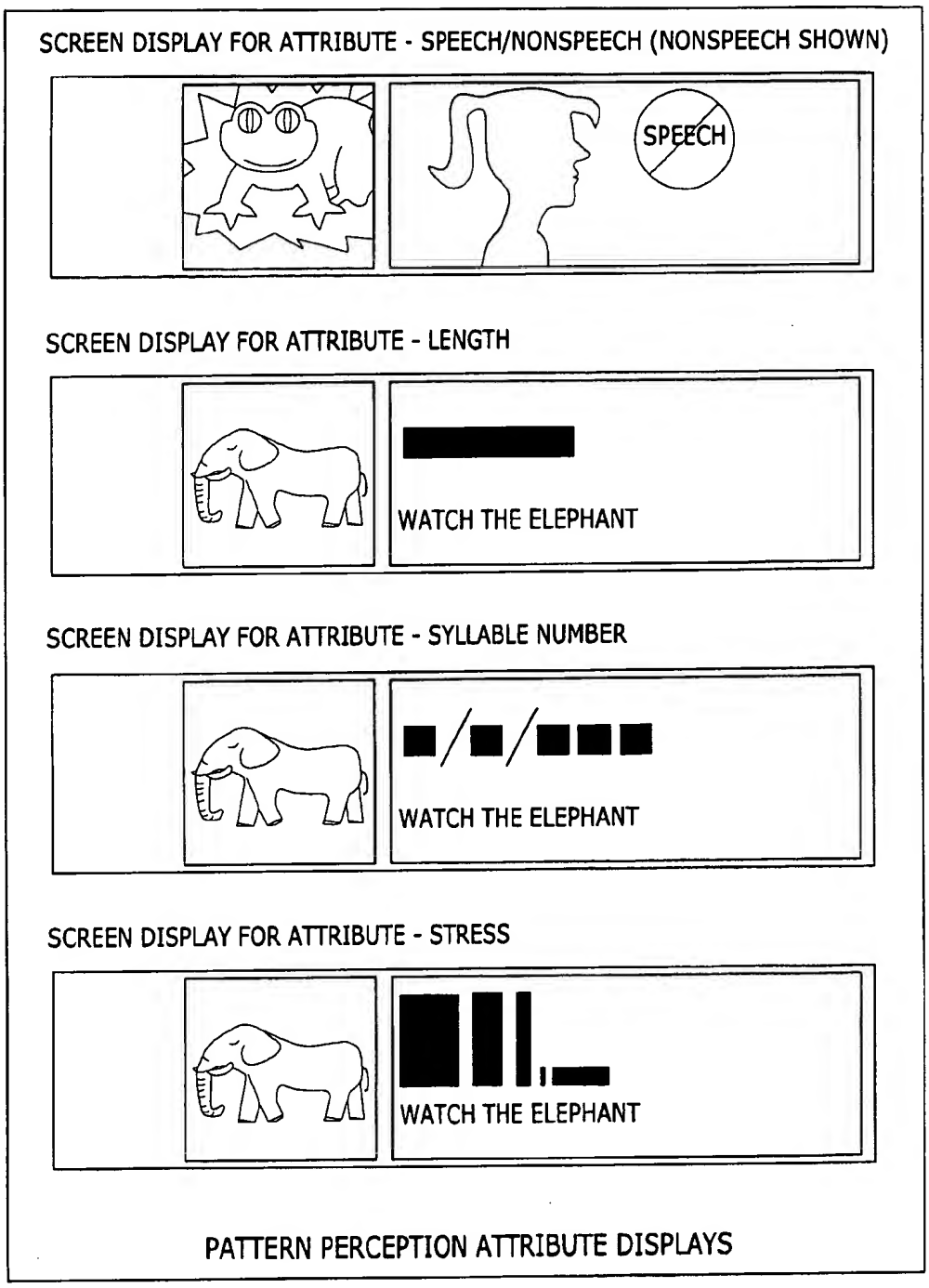

SCREEN DISPLAY FOR ATTRIBUTE - SPEECH/NONSPEECH (NONSPEECH SHOWN)
SPEECH
SCREEN DISPLAY FOR ATTRIBUTE - LENGTH
WATCH THE ELEPHANT
SCREEN DISPLAY FOR ATTRIBUTE - SYLLABLE NUMBER
WATCH THE ELEPHANT
SCREEN DISPLAY FOR ATTRIBUTE - STRESS
WATCH THE ELEPHANT
PATTERN PERCEPTION ATTRIBUTE DISPLAYS

Fig. 6A

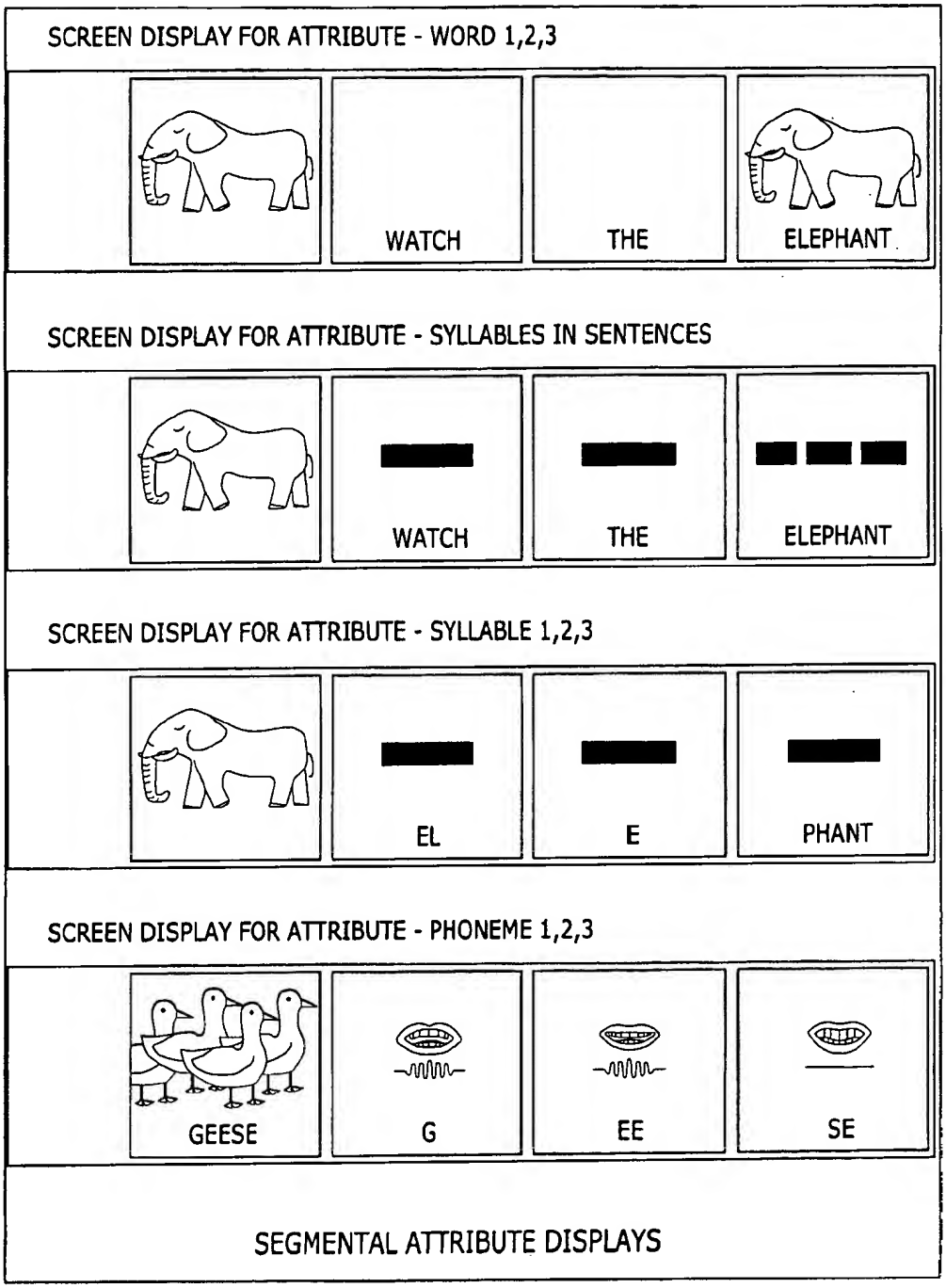

SCREEN DISPLAY FOR ATTRIBUTE - WORD 1,2,3
WATCH
THE
ELEPHANT
SCREEN DISPLAY FOR ATTRIBUTE - SYLLABLES IN SENTENCES
WATCH
THE
ELEPHANT
SCREEN DISPLAY FOR ATTRIBUTE - SYLLABLE 1,2,3
EL
E
PHANT
SCREEN DISPLAY FOR ATTRIBUTE - PHONEME 1,2,3
GEESE
G
EE
SE
SEGMENTAL ATTRIBUTE DISPLAYS

Fig. 6B

TARGET-TOP LEVEL		TCLUE 1	TCLUE2	TCLUE3	RESPONSE TOP LEVEL	RCLUE1	RCLUE2	RCLUE3
AV LEVEL 1	AUDIO-ON				ON			
	VISUAL-ON				ON			
AV LEVEL 2	AUDIO-ON	D	D	D	ON	D	D	D
	VISUAL-D	D	D	D	ON	ON	ON	ON
AV LEVEL 3	AUDIO-ON	D	D	D	ON	D	D	D
	VISUAL-N	D	D	D	ON	ON	ON	ON
AV LEVEL 4	AUDIO-ON	D	D	D	ON	D	D	D
	VISUAL-N	N	N	N	ON	D	D	D
AV LEVEL 5	AUDIO-ON				ON			
	VISUAL-N				D			

AUDITORY VISUAL LEVELS-DISCRIMINATION TASK

RESPONSE-TOP LEVEL		RCLUE1	RCLUE2	RCLUE3
AV LEVEL 1	AUDIO-ON			
	VISUAL-ON			
AV LEVEL 2	AUDIO-ON	ON	ON	ON
	VISUAL-D	ON	ON	ON
AV LEVEL 3	AUDIO-ON	D	D	D
	VISUAL-D	D	D	D
AV LEVEL 4	AUDIO-ON	D	D	D
	VISUAL-N	D	D	D
AV LEVEL 5	AUDIO-ON	D	D	D
	VISUAL-N	N	N	N
AV LEVEL 6	AUDIO-ON			
	VISUAL-N			

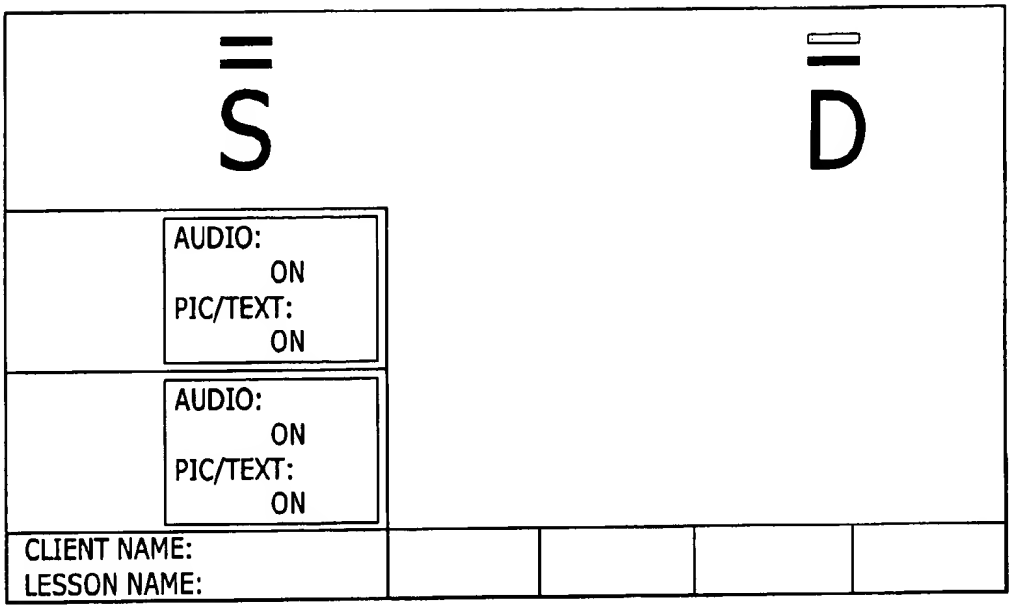
A/V LEVEL KEY

ON=ALWAYS
D=AVAILABLE ON DEMAND
N=NOT AVAILABLE
TCLUE=TARGET CLUE 1,2 OR 3
RCLUE*=RESPONSE CLUE 1,2 OR 3

*RESPONSE 1 AND 2 A/V LEVELS ARE ALWAYS DISPLAYED THE SAME.

AUDITORY VISUAL LEVELS-IDENTIFICATION TASK

Fig. 7



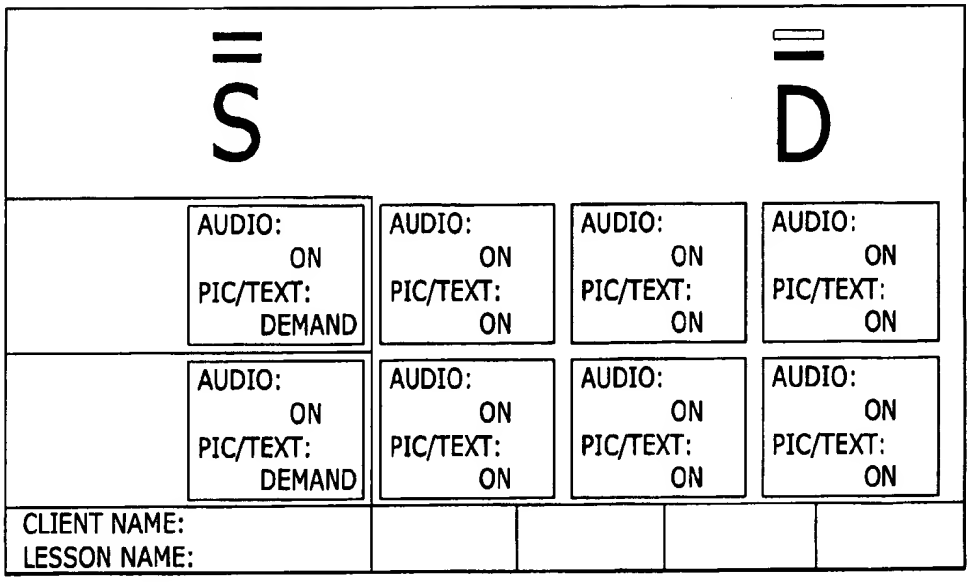
AV SETTINGS:

ON: ALWAYS AVAILABLE
NO: NEVER AVAILABLE
DEMAND: NOT PRESENTED INTIALLY,
BUT AVAILABLE UPON REQUEST

A/V LEVEL1: FULL AUDIO-VISUAL SUPPORT AT TOP LEVEL

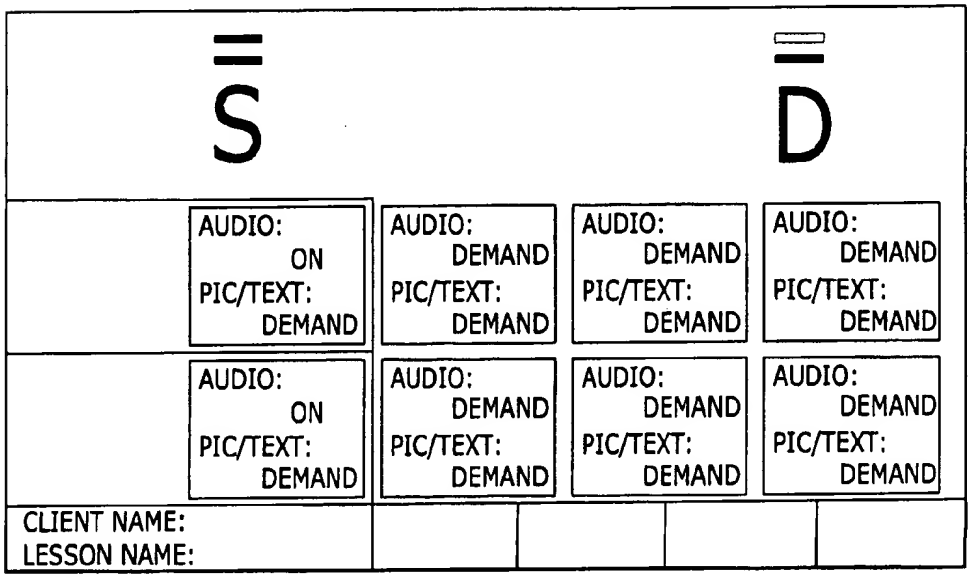
AUDITORY/VISUAL LEVELS-DISCRIMINATION TASK

Fig. 8A



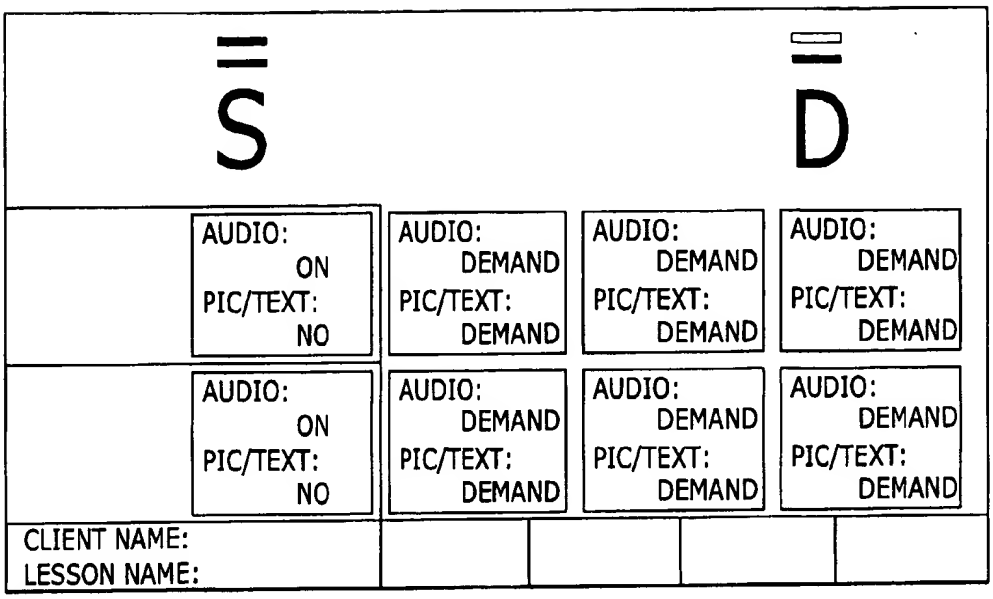
A/V LEVEL 2: AUDIO-VISUAL SUPPORT FOR ATTRIBUTES, TOP LEVEL SUPPORT ON DEMAND

Fig. 8B



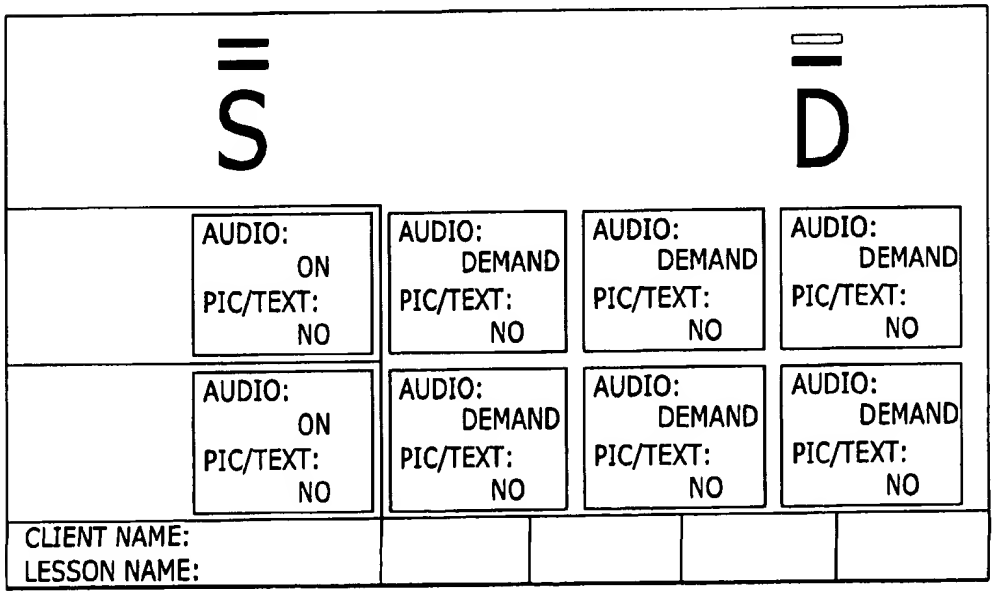
A/V LEVEL 3: AUDIO-VISUAL SUPPORT ON DEMAND FOR ALL LEVELS

Fig. 8C



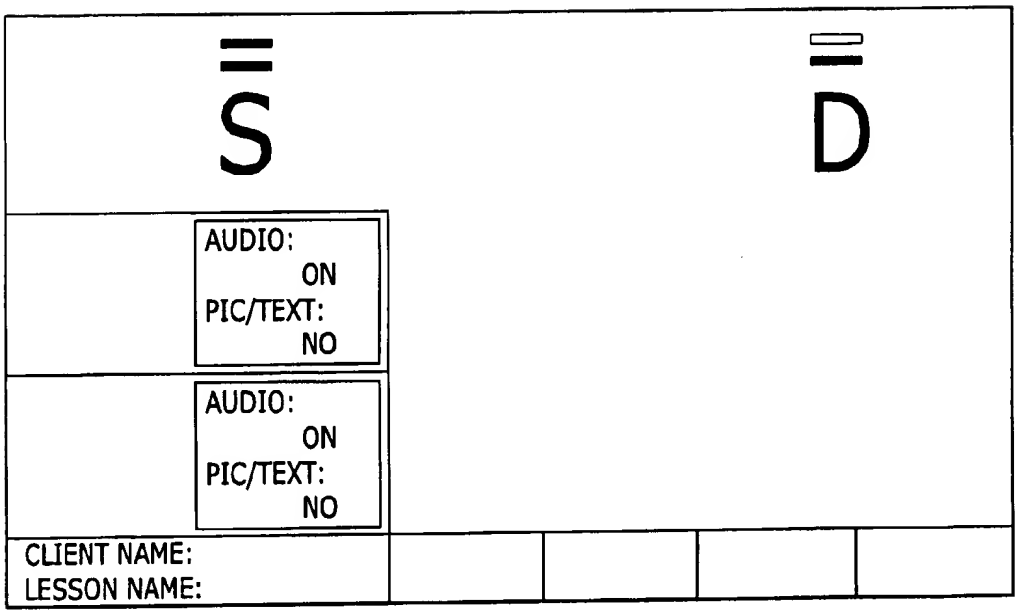
A/V LEVEL 4: AUDIO-VISUAL ATTRIBUTE SUPPORT ON DEMAND, AUDIO SUPPORT ONLY FOR TOP LEVEL

Fig. 8D



A/V LEVEL 5: AUDIO SUPPORT ONLY FOR ALL LEVELS

Fig. 8E



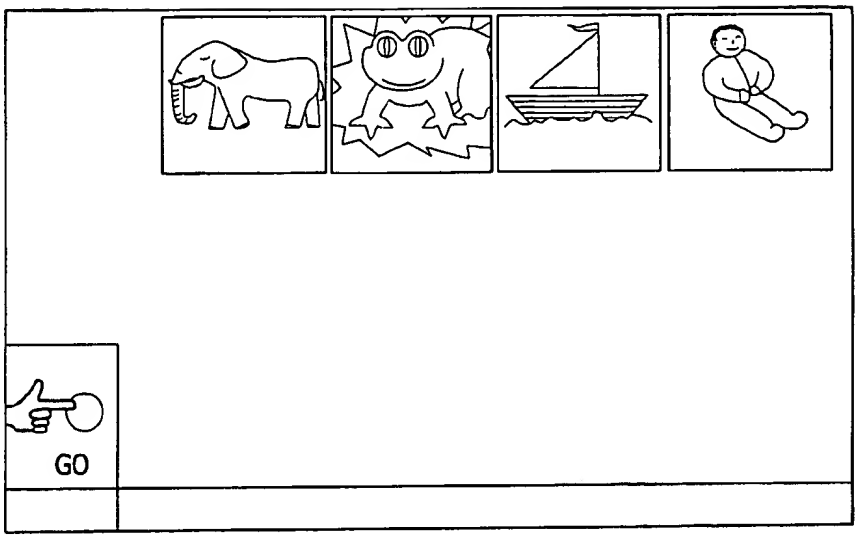
A/V LEVEL 6: AUDIO SUPPORT ONLY AT TOP LEVEL

Fig. 8F

STRATEGY TYPE	AV SET	WORD GROUP	RATE
BADFAST	AUDITORY	DIFFERENT	FAST
BADMED	AUDITORY	DIFFERENT	MEDIUM
BADSLOW	AUDITORY	DIFFERENT	SLOW
BASFAST	AUDITORY	SAME	FAST
BASMED	AUDITORY	SAME	MEDIUM
BASSLOW	AUDITORY	SAME	SLOW
BVSFAST	VISUAL	SAME	FAST
BVSMED	VISUAL	SAME	MEDIUM
BVSSLOW	VISUAL	SAME	SLOW
BVDFAST	VISUAL	DIFFERENT	FAST
BVDMED	VISUAL	DIFFERENT	MEDIUM
BVDSLOW	VISUAL	DIFFERENT	SLOW
TADFAST	AUDITORY	DIFFERENT	FAST
TADMED	AUDITORY	DIFFERENT	MEDIUM
TADSLOW	AUDITORY	DIFFERENT	SLOW
TASFAST	AUDITORY	SAME	FAST
TASMED	AUDITORY	SAME	MEDIUM
TASSLOW	AUDITORY	SAME	SLOW
TVSFAST	VISUAL	SAME	FAST
TVSMED	VISUAL	SAME	MEDIUM
TVSSLOW	VISUAL	SAME	SLOW
TVDFAST	VISUAL	DIFFERENT	FAST
TVDMED	VISUAL	DIFFERENT	MEDIUM
TVDSLOW	VISUAL	DIFFERENT	SLOW

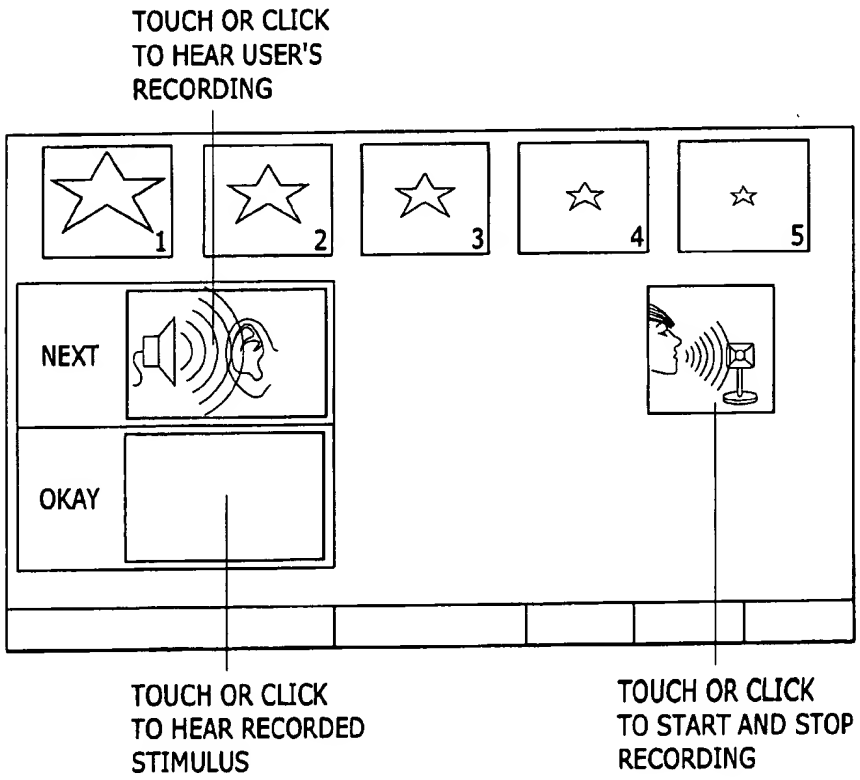
STRATEGY

Fig. 9



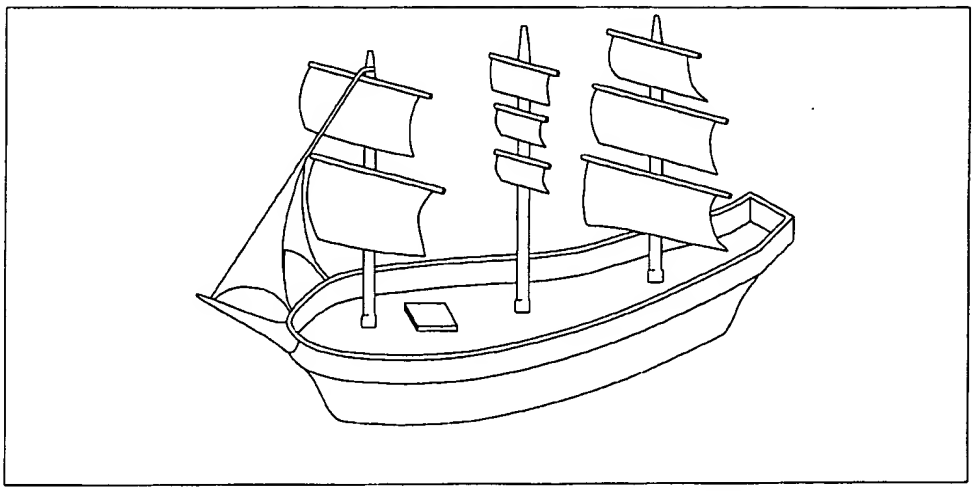
PREVIEW

Fig. 10



PRODUCTION TRAINING

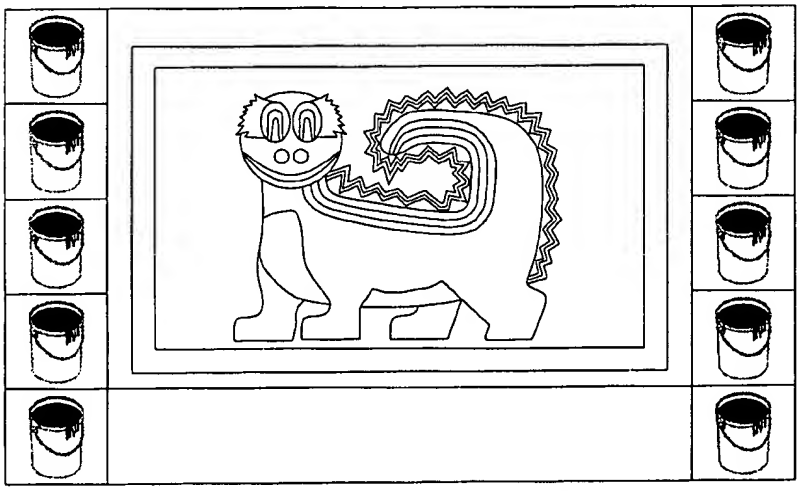
Fig. 11



THIS PUZZLE HAS BEEN COMPLETED-THE USER WOULD HAVE RECEIVED "PIECES" OF SHIP: PERHAPS THE SHIP'S DECK, THEN A SAIL, THEN A MAST ETC...

FEEDBACK

Fig. 12A



PAINTING FEEDBACK DISPLAY

Fig. 12B

SELECT LEVEL OF SPEECH PERCEPTION			
PATTERN PERCEPTION SERIES (PROCEED TO PAGE 4)			
CAN THE USER DIFFERENTIATE BETWEEN SPEECH AND NONSPEECH?	YES	NO	DON'T KNOW - GO TO N-SCREEN
CAN THE USER DIFFERENTIATE BETWEEN LENGTH OF SPEECH UTTERANCES?	YES	NO	DON'T KNOW - GO TO L-SCREEN
IS THE USER AWARE OF NUMBERS OF SYLLABLES IN SPEECH UTTERANCES?	YES	NO	DON'T KNOW - GO TO U-SCREEN
	YES	NO	DON'T KNOW - GO TO T-SCREEN
WORD PERCEPTION SERIES (PROCEED TO PAGE 5)			
CAN THE USER DIFFERENTIATE BETWEEN SINGLE WORDS AND A SEQUENCE OF 2-3 WORDS?	YES	NO	DON'T KNOW - GO TO M-SCREEN
CAN THE USER DIFFERENTIATE WORDS WHICH ARE ALL DIFFERENT IN THREE-WORD SENTENCES?	YES	NO	DON'T KNOW - GO TO D-SCREEN
CAN THE USER DIFFERENTIATE THE FINAL WORD IN A THREE WORD SENTENCE WHEN ONLY THE FINAL WORD IS DIFFERENT?	YES	NO	DON'T KNOW - GO TO S-SCREEN
SYLLABLE PERCEPTION SERIES (PROCEED TO PAGE 6)			
CAN THE USER DISTINGUISH BETWEEN WORDS WHICH HAVE DIFFERENT NUMBERS OF SYLLABLES?	YES	NO	DON'T KNOW - GO TO Y-SCREEN
PHONEME PERCEPTION SERIES (PROCEED TO PAGE 7)			
CAN THE USER DIFFERENTIATE VOWEL DIFFERENCES IN ONE SYLLABLE WORDS?	YES	NO	DON'T KNOW - GO TO C-SCREEN
CAN THE USER DIFFERENTIATE CONSONANT DIFFERENCES IN ONE SYLLABLE WORDS?	YES	NO	DON'T KNOW - GO TO V-SCREEN

Fig. 13

SELECT A PATTERN LESSON PACKAGE	
SPEECH VS. NONSPEECH (IF UNSURE OF PLACEMENT, SCREEN WITH N-SCREEN PACKAGE)	
NONSPEECH SOUNDS ARE CONTRASTED WITH ONE SYLLABLE WORDS.	NONSPCH-1
NONSPEECH SOUNDS ARE CONTRASTED WITH 3-5 SYLLABLE SPEECH UTTERANCES.	NONSPCH-2
NONSPEECH SOUNDS ARE CONTRASTED WITH OTHER NONSPEECH SOUNDS.	NONSPCH-3
LENGTH (IF UNSURE OF PLACEMENT, SCREEN WITH L-SCREEN PACKAGE)	
NONSPEECH SOUNDS ARE CONTRASTED WITH ONE SYLLABLE WORDS.	LENGTH-1
NONSPEECH SOUNDS ARE CONTRASTED WITH 3-5 SYLLABLE SPEECH UTTERANCES.	LENGTH-2
1-3 SYLLABLE WORDS ARE CONTRASTED WITH 2-5 SYLLABLE CONNECTED SPEECH.	LENGTH-3
1,2 AND 3 SYLLABLE WORDS ARE CONTRASTED	LENGTH-4
CONNECTED SPEECH UTTERANCES VARYING IN LENGTH FROM 2-5 SYLLABLES ARE CONTRASTED.	LENGTH-5
SYLLABLE NUMBER (IF UNSURE OF PLACEMENT, SCREEN WITH U-SCREEN PACKAGE)	
ONE SYLLABLE WORDS ARE CONTRASTED WITH 2 OR 3 SYLLABLE WORDS WHICH HAVE DIFFERENT SPECTRAL INFORMATION.	SYLNUM-1
ONE SYLLABLE WORDS ARE CONTRASTED WITH 2 OR 3 SYLLABLE WORDS WHICH HAVE SIMILAR SPECTRAL INFORMATION.	SYLNUM-2
STRESS (IF UNSURE OF PLACEMENT, SCREEN WITH T-SCREEN PACKAGE)	
ONE SYLLABLE WORDS ARE CONTRASTED WITH 2-5 SYLLABLE CONNECTED SPEECH UTTERANCES.	STRESS-1
TWO SYLLABLE WORDS ARE CONTRASTED WITH 2-5 SYLLABLE CONNECTED SPEECH UTTERANCES.	STRESS-2
THREE SYLLABLE WORDS ARE CONTRASTED WITH 2-5 SYLLABLE CONNECTED SPEECH UTTERANCES.	STRESS-3
1-3 SYLLABLE UTTERANCES ARE CONTRASTED.	STRESS-4
2-5 SYLLABLE CONNECTED SPEECH UTTERANCES ARE CONTRASTED.	STRESS-5

Fig. 14A

SELECT A WORD PERCEPTION LESSON PACKAGE	
MIXED SENTENCES (IF UNSURE OF PLACEMENT, SCREEN WITH M-SCREEN PACKAGE)	
ONE SYLLABLE WORDS ARE CONTRASTED WITH 2-5 SYLLABLE CONNECTED SPEECH UTTERANCES.	MIXSEN-1
TWO SYLLABLE WORDS ARE CONTRASTED WITH 2-5 SYLLABLE CONNECTED SPEECH UTTERANCES.	MIXSEN-2
THREE SYLLABLE WORDS ARE CONTRASTED WITH 2-5 SYLLABLE CONNECTED SPEECH UTTERANCES.	MIXSEN-3
2-5 SYLLABLE CONNECTED SPEECH UTTERANCES ARE CONTRASTED.	MIXSEN-4
DIFFERENT SENTENCES (IF UNSURE OF PLACEMENT, SCREEN WITH D-SCREEN PACKAGE)	
TWO SENTENCES ARE CONTRASTED IN WHICH ALL THE WORDS ARE DIFFERENT. THE SENTENCES CONSIST OF 3 ONE SYLLABLE WORDS.	DIFSEN-1
TWO SENTENCES ARE CONTRASTED IN WHICH ALL THE WORDS ARE DIFFERENT. THE FINAL WORD OF THE SENTENCES HAS EITHER 2 OR 3 SYLLABLES.	DIFSEN-2
TWO SENTENCES ARE CONTRASTED IN WHICH ALL THE WORDS ARE DIFFERENT. THE FINAL WORD IN EACH SENTENCE IS A ONE SYLLABLE WORD WHICH DIFFERS ONLY BY VOWEL, INITIAL CONSONANT OR FINAL CONSONANT.	DIFSEN-3
SAME SENTENCES (IF UNSURE OF PLACEMENT, SCREEN WITH S-SCREEN PACKAGE)	
TWO SENTENCES ARE CONTRASTED IN WHICH THE FIRST TWO WORDS ARE THE SAME AND THE FINAL WORD IS SYLLABICALLY DIFFERENT. THE FINAL WORD HAS EITHER ONE OR THREE SYLLABLES.	SAMSEN-1
TWO SENTENCES ARE CONTRASTED IN WHICH THE FIRST TWO WORDS ARE THE SAME AND THE FINAL WORD IS DIFFERENT. THE SENTENCES CONSIST OF THREE ONE-SYLLABLE WORDS.	SAMSEN-2
TWO SENTENCES ARE CONTRASTED IN WHICH THE FIRST TWO WORDS ARE THE SAME AND THE FINAL WORD IS SYLLABICALLY DIFFERENT. THE FINAL WORD HAS EITHER TWO OR THREE SYLLABLES.	SAMSEN-3
TWO SENTENCES ARE CONTRASTED IN WHICH THE FIRST TWO WORDS ARE THE SAME AND THE FINAL WORD IS DIFFERENT. THE FINAL WORD IN EACH SENTENCE IS A ONE-SYLLABLE WORD WHICH DIFFERS ONLY BY VOWEL, INITIAL CONSONANT OR FINAL CONSONANT.	SAMSEN-4

Fig. 14B

SELECT A SYLLABLE PERCEPTION LESSON PACKAGE	
SYLLABLES (IF UNSURE OF PLACEMENT, SCREEN WITH Y-SCREEN PACKAGE)	
1-3 SYLLABLE WORDS WHICH HAVE DIFFERENT SPECTRAL CHARACTERISTICS ARE CONTRASTED.	SYL123-1
1-3 SYLLABLE WORDS WHICH MAY HAVE SIMILAR OR DIFFERENT SPECTRAL CHARACTERISTICS ARE CONTRASTED.	SYL123-2
1-3 SYLLABLE WORDS WHICH HAVE LOW FREQUENCY CHARACTERISTICS ARE CONTRASTED.	SYL123-3
1-3 SYLLABLE WORDS WHICH HAVE HIGH FREQUENCY CHARACTERISTICS ARE CONTRASTED.	SYL123-4
1 SYLLABLE WORDS WHICH HAVE SIMILAR SPECTRAL CHARACTERISITICS ARE CONTRASTED.	SYL123-5
2 SYLLABLE WORDS WHICH HAVE SIMILAR SPECTRAL CHARACTERISTICS ARE CONTRASTED.	SYL123-6
3 SYLLABLE WORDS WHICH HAVE SIMILAR SPECTRAL CHARACTERISTICS ARE CONTRASTED.	SYL123-7
SYLLABLES (SEMANTIC LESSONS-HAVE NO SCREENING LESSON PACKAGE)	
ANIMALS AND ANIMAL PARTS LESSONS WITH 1-3 SYLLABLE CONTRASTS.	SEMAN-1
FOODS WITH 1-3 SYLLABLE CONTRASTS.	SEMAN-2
COLORS, BODY PARTS AND CLOTHING PIECES WITH 1-3 SYLLABLE CONTRASTS.	SEMAN-3
HOME ITEMS, TOYS AND TRANSPORTATION WITH 1-3 SYLLABLE CONTRASTS.	SEMAN-4
JOBS, VERBS AND BUILDINGS WITH 1-3 SYLLABLE CONTRASTS.	SEMAN-5

Fig. 14C

SELECT A PHONEME LESSON PACKAGE	
CONSONANTS (IF UNSURE OF PLACEMENT, SCREEN WITH C-SCREEN PACKAGE)	
INITIAL CONSONANT VOICING, PLACEMENT AND MANNER DIFFERENCES ARE CONTRASTED.	CONSON-1
FINAL CONSONANT VOICING, PLACEMENT AND MANNER DIFFERENCES ARE CONTRASTED.	CONSON-2
VOWELS (IF UNSURE OF PLACEMENT, SCREEN WITH V-SCREEN PACKAGE)	
HIGH VOWELS VS. MID DIPTHONGS/VOWELS ARE CONTRASTED.	VOWEL-1
HIGH VOWELS VS. HIGH OR LOW DIPTHONGS/VOWELS ARE CONTRASTED.	VOWEL-2
HIGH, LOW OR MID DIPTHONGS/VOWELS VS. MID OR HIGH DIPTHONGS/VOWELS ARE CONTRASTED.	VOWEL-3

Fig. 14D

SELECT THE TASK MODE		
DO YOU WANT THE USER TO MAKE SAME/DIFFERENT JUDGMENTS ABOUT THE STIMULI (DISCRIMINATION TASK)?	YES	NO
DO YOU WANT THE USER TO MATCH A TARGET TO ONE OF SEVERAL CHOICES (IDENTIFICATION TASK)?	YES	NO

Fig. 15

SELECT THE STRATEGY FOR MOVING THROUGH THE LESSONS				
INITIAL PRESENTATION	DOES THE USER NEED TO HEAR BOTH THE TARGETED STIMULUS AND THE POSSIBLE CHOICES OR ONLY THE TARGETED STIMULUS ON INITIAL PRESENTATION?	T=TARGET ONLY	B=BOTH TARGET AND ANSWERS	
SUPPORT	IF THE USER CANNOT PERFORM WITH AUDITORY INFORMATION ALONE, IS IT APPROPRIATE TO INTRODUCE VISUAL INFORMATION WITH THE AUDITORY INFORMATION?	V=VISUAL OKAY	A=AUDITORY ONLY	
SAME/ DIFFERENT WORD GROUP	AS THE TASKS PROGRESS FROM AUDITORY/VISUAL SUPPORT, DOES THE USER NEED TO SEE THE SAME GROUP OF STIMULI OR NEW STIMULI?	S=SAME GROUP	D=DIFFERENT GROUP	
RATE	AS THE USER PROGRESSES THROUGH A SERIES OF TASKS, WHAT RATE IS APPROPRIATE? IS IT APPROPRIATE FOR THE USER TO SYSTEMATICALLY PROGRESS FROM AV LEVEL 1-5 (SLOW), OR SKIP EVERY OTHER AV LEVEL (MEDIUM), OR PROGRESS TO THE MOST DIFFICULT LEVEL AFTER THE ENTRY LEVEL (FAST)?	SLOW	MEDIUM	FAST

Fig. 16

SELECT THE AUDIO/VISUAL (AV) SUPPORT	
THE USER NEEDS TO SEE/HEAR FULL AV SUPPORT AT THE ONSET OF TRAINING.	LEVEL 1
THE USER SHOULD HAVE ACCESS TO FULL AV SUPPORT EVEN IF IT IS NOT AVAILABLE INITIALLY.	LEVEL 2
THE USER CAN PERFORM WITH AUDITORY-ONLY INFORMATION AT THE TARGETED TOP LEVEL. ACCESS TO ALL OTHER AV SUPPORT IS AVAILABLE ON REQUEST.	LEVEL 3
THE USER CAN PERFORM WITH AUDITORY-ONLY INFORMATION AT THE TARGETED TOP LEVEL WHEN NO CLUE SUPPORT IS AVAILABLE AT THE TOP LEVEL.	LEVEL 4
THE USER CAN PERFORM WITH AUDITORY-ONLY INFORMATION AT THE TARGETED TOP LEVEL WHEN NO CLUE SUPPORT IS AVAILABLE AT THE TARGET OR ANSWER LEVELS.	LEVEL 5

Fig. 17

SELECT SPECIFIC TASKS		
DO YOU WANT THE USER TO HAVE THE PRETEST TASK?	YES	NO
DO YOU WANT THE USER TO HAVE THE PREVIEW TASK?	YES	NO
DO YOU WANT THE USER TO HAVE THE TRAINING TASKS (DISCRIMINATION AND/OR IDENTIFICATION) IN THEIR LESSONS?	YES	NO
DO YOU WANT THE USER TO DO THE PRODUCTION TASK?	YES	NO
DO YOU WANT THE USER TO HAVE THE POSTTEST TASK?	YES	NO

Fig. 18

SELECT THE USER'S LESSON DEFAULTS			
CHOOSE FEEDBACK SETTINGS			
IF THE PUZZLE FEEDBACK IS PRESENTED, SPECIFY AFTER HOW MANY TASKS?	__#		
IS ANY TRY O.K.? (IF NO, THE NUMBER OF PUZZLE PIECES PRESENTED IS CONTINGENT ON THE USER'S PERFORMANCE; OTHERWISE, ALL PUZZLE PIECES ARE GIVEN.)	YES		NO
IF THE PAINTING TASK IS TO BE GIVEN, AFTER HOW MANY TASKS AND FOR WHAT TIME PERIOD?	_TASKS		_SEC.
SHOULD THE GREEN MAGIC CHARACTER BE AVAILABLE ON SCREEN DISPLAYS?	YES		NO
CHOOSE TASK SETTINGS			
HOW MANY TRAINING CONTRASTS SHOULD THE USER HAVE?	__#		
HOW MANY REPETITIONS OF EACH OF THE TRAINING CONTRASTS SHOULD THE USER HAVE?	__#		
HOW MANY TEST CONTRASTS SHOULD THE USER HAVE?	__#		
HOW MANY REPETITIONS OF EACH OF THE TEST CONTRASTS SHOULD THE USER HAVE?	__#		
SHOULD A 2-CHOICE OR 4-CHOICE SCREEN BE GIVEN IN THE IDENTIFICATION TASK?	2		4
HOW MANY RETRIES FOR EACH TRIAL SHOULD BE GIVEN?	__#		
CHOOSE LIBRARIES FOR AV SETTINGS			
SHOULD THE TEXT BE SHOWN?	YES		NO
WHICH PICTURE GROUP IS APPROPRIATE TO USE FOR VISUAL SUPPORT? (ST=STANDARD ILLUSTRATIONS, O=ORAL [MOUTH POSTURES], SEE 2 =SIGNING EXACT ENGLISH.)	ST	O	SEE 2

Fig. 19

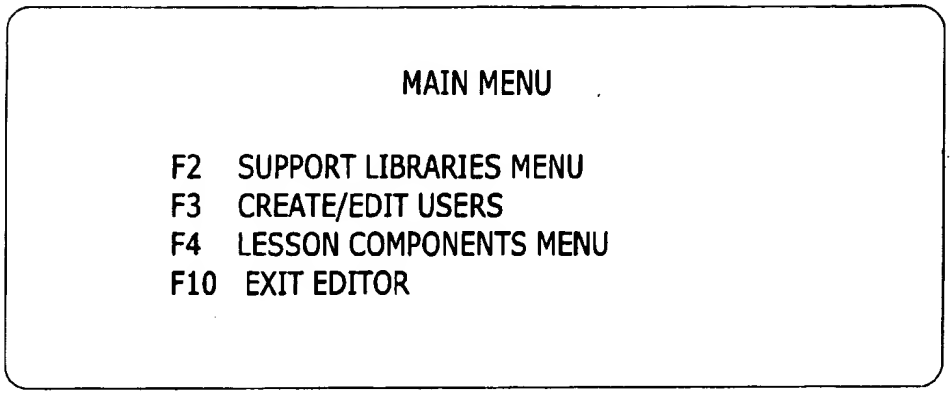


Fig. 20A

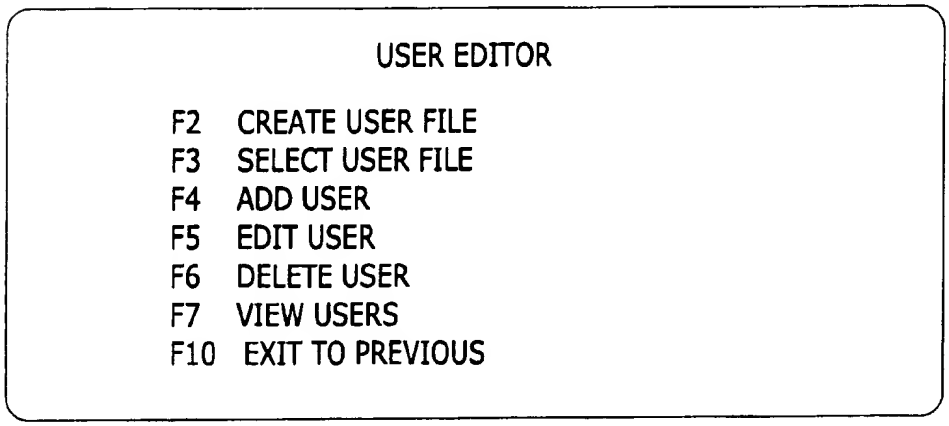


Fig. 20B

Fig. 20C

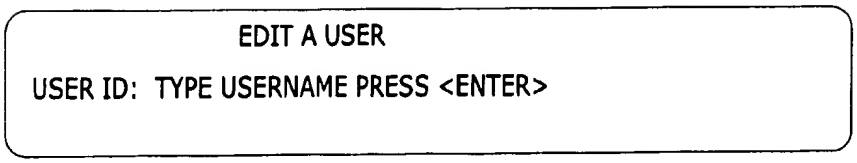


Fig. 20D

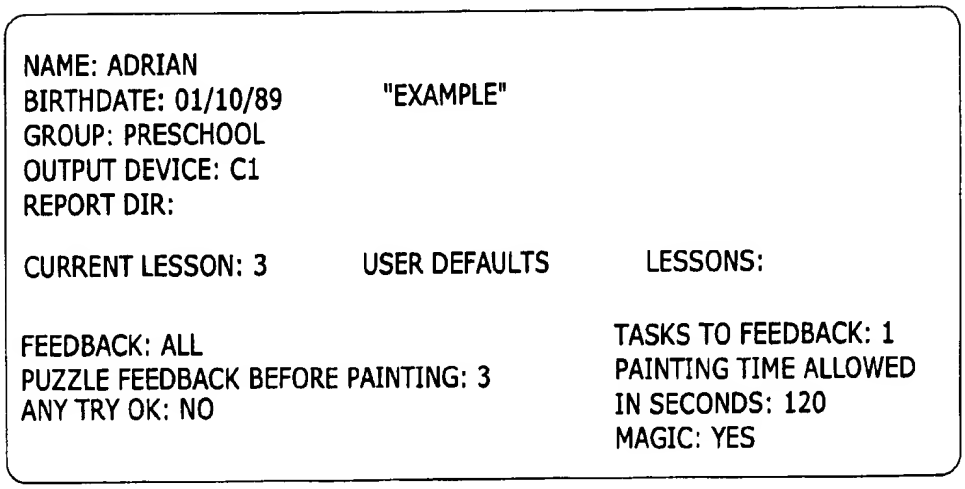


Fig. 20E

F1=HELP /TAB/BKTAB/ENTER=MOVE DEL=DELETE ESC=PREVIOUS SCREEN

USER: STANDARD
LESSON: * PERCEPTION MODE: *
WORDLIST: F2 STRATEGY: F2
ATTRIBUTE SET: F2 STARTING AV LEVEL: #

TASKS

PREVIEW: * TRAINING: * TASK PASS %: #
PRETEST: * POSTTEST: * RESERVE TESTING GROUP: *
PRETEST JUDGMENT: * ADVANCE %: # ENTER %: #
PRODUCTION: * PRODUCTION AV LEVEL: #
METHOD OF GROUPING CONTRASTS FROM WORDLIST: *

TASK SETTINGS

TRAINING CONTRASTS: # REPS/TRAINING CONTRASTS: # (TRIALS=)
TEST CONTRASTS: # REPS/TEST CONTRASTS: # (TRIALS=)
NUMBER OF SCREEN CHOICES: * RETRIES PER TRIAL: #

AV LIBRARY SETTINGS

USE TEXT: * SITE GROUP: #
PICTURE GROUP: * AUDIO GROUP: *
AUDIO OVERLAY NAME: F2 AUDIO OVERLAY LEVEL: #

TO ENTER YOUR SELECTIONS THE FOLLOWING KEY EXPLAINS THE NECESSARY ACTION NEEDED TO ENTER/CHANGE THE ABOVE OPTIONS:
F2 = MAKE YOUR SELECTION BY PRESSING F2, THEN MOVE THE CURSOR TO THE DESIRED ENTRY AND PRESS <ENTER>.
* = SELECTIONS CAN BE MADE BY PRESSING THE SPACE BAR.
# = ENTER THE DESIRED NUMBER AFTER BACKSPACING OVER THE CURRENT VALUE.
(TRIALS =) = THESE NUMBERS WILL BE AUTOMATICALLY CALCULATED.

Fig. 20F

F1=HELP /TAB/BKTAB=MOVE DEL=DELETE F5=LOAD PACKAGE INS=
INSERT SPACE
F2=SELECT LESSON ENTER=SELECT
USER: STANDARD

	LESSON	TASK MODE	WORDLIST	ATTRIBUTE	STRATEGY	STARTING AV LEVEL
	DEFAULTS					
1)						
2)						
3)						
4)						
5)						
6)						
7)						
8)						
9)						
10)						
11)						
12)						
13)						
14)						
15)						

Fig. 20G

DO YOU WISH TO USE THE USER'S DEFAULT?

Fig. 20H

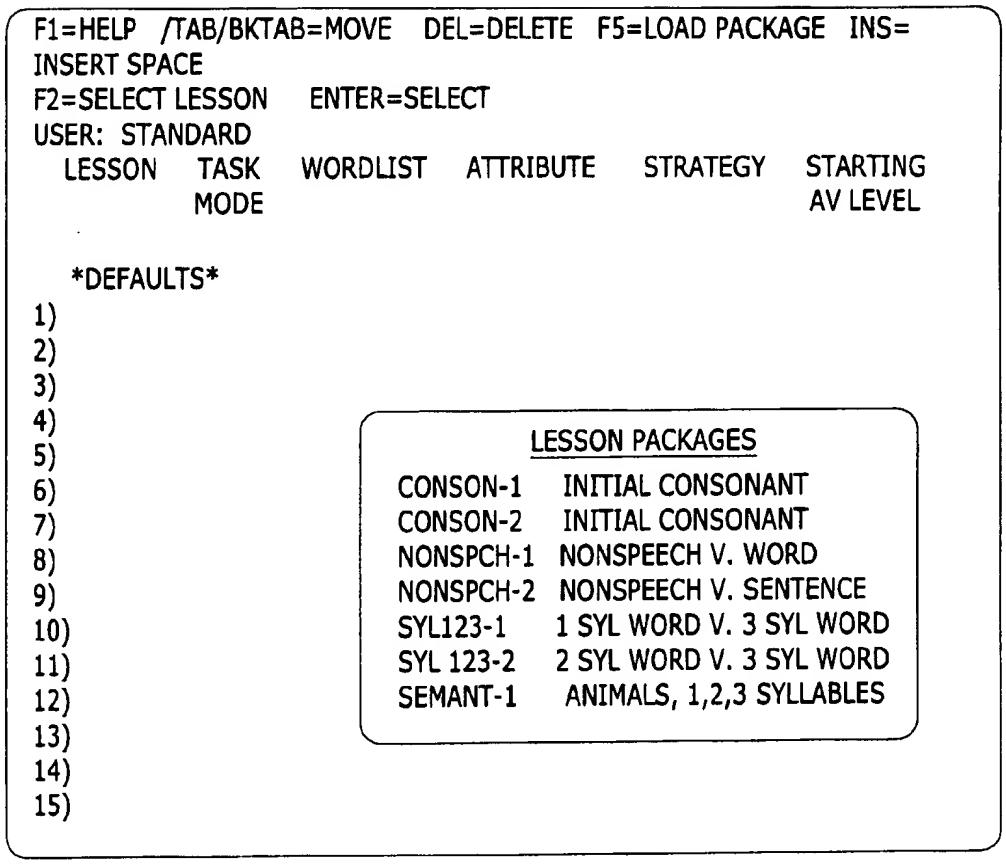


Fig. 20I

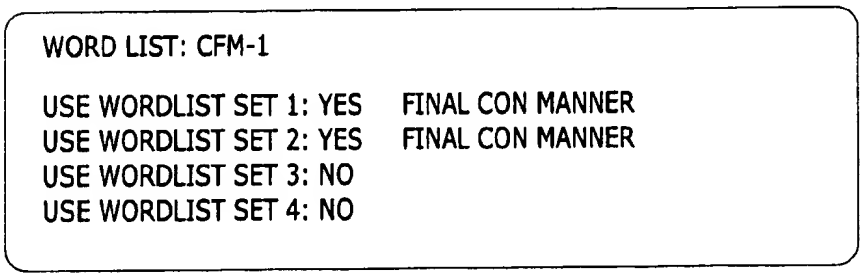


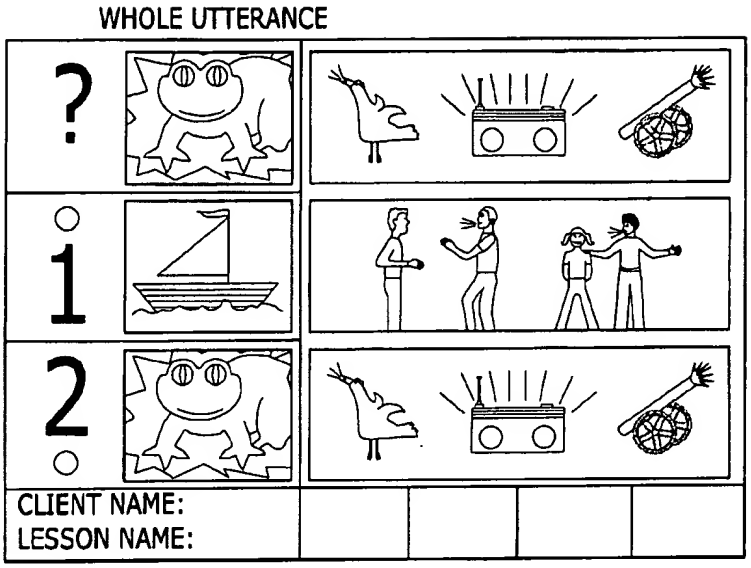
Fig. 20J

BADFAST	AUD/DIFFERENT/FAST
BADMED	AUD/DIFFERENT/MEDIUM
BADSLOW	AUD/DIFFERENT/SLOW
BASFAST	AUD/SAME/FAST
BASMED	AUD/SAME/FAST
BASSLOW	AUD/DIFFERENT/SLOW
BVDFAST	VIS/DIFFERENT/FAST
BVDMED	VIS/DIFFERENT/MEDIUM
BVDSLOW	VIS/DIFFERENT/SLOW
BVSFAST	VIS/SAME/FAST
BVSMED	VIS/SAME/MEDIUM
BVSSLOW	VIS/SAME/SLOW
TADFAST	AUD/DIFFERENT/FAST
TADMED	AUD/DIFFERENT/MEDIUM
TADSLOW	AUD/DIFFERENT/SLOW
TASFAST	AUD/SAME/FAST
TASMED	AUD/SAME/MEDIUM
TASSLOW	AUD/SAME/SLOW
TVDFAST	VIS/DIFFERENT/FAST
TVDMED	VIS/DIFFERENT/MEDIUM
TVDSLOW	VIS/DIFFERENT/SLOW
TVSFAST	VIS/SAME/FAST
TVSMED	VIS/SAME/MEDIUM
TVSSLOW	VIS/SAME/SLOW

Fig. 20K

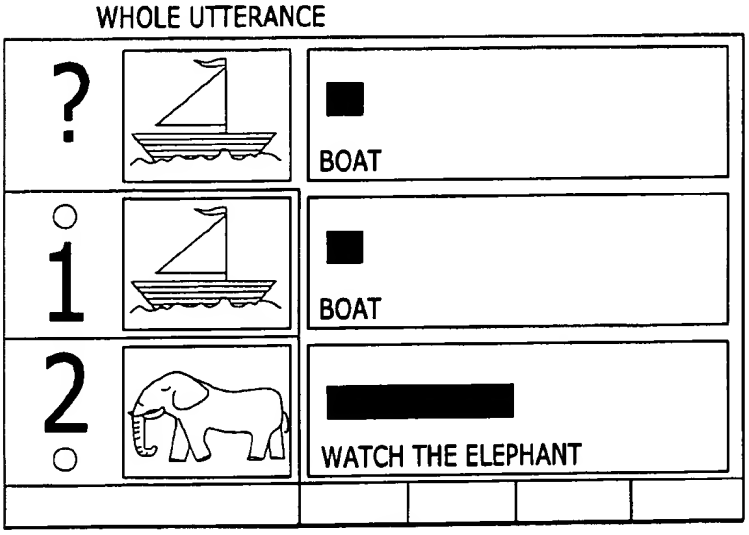
LENGTH	LENGTH
NONSPEECH	NONSPEECH
PHONEME	PHONEME
STRESS	STRESS
SYL123	SYLLABLE 1 2 3
SYLINSSENT	SYLLABLES IN SENTENCES
SYLNUM	SYLLABLE NUMBER
WORD 123	WORD 123

Fig. 20L



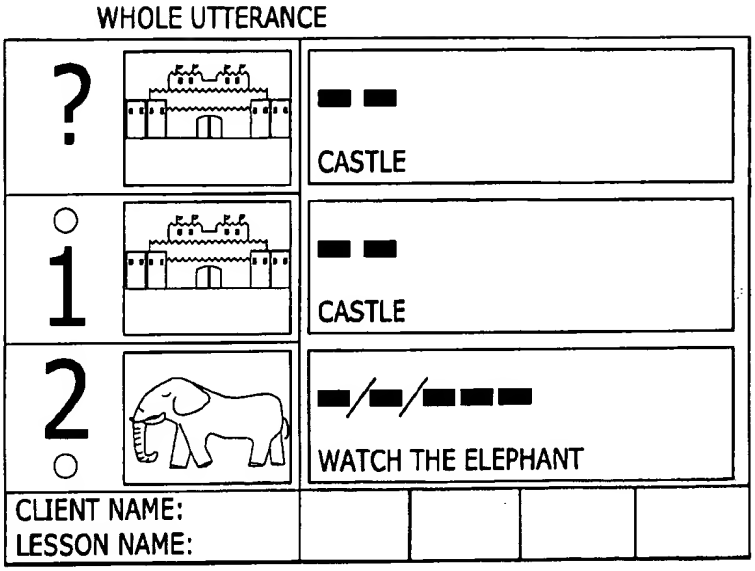
SPEECH AND NONSPEECH
PATTERN PERCEPTION

Fig. 21A



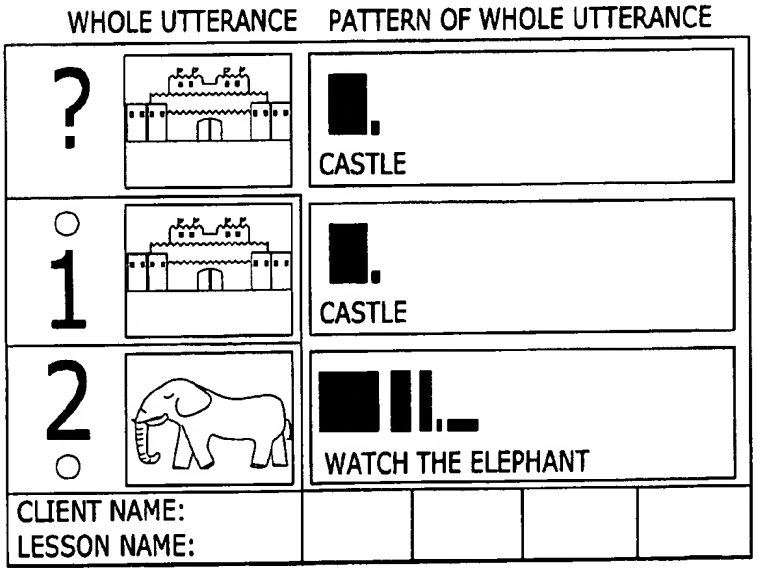
LENGTH
PATTERN PERCEPTION

Fig. 21B



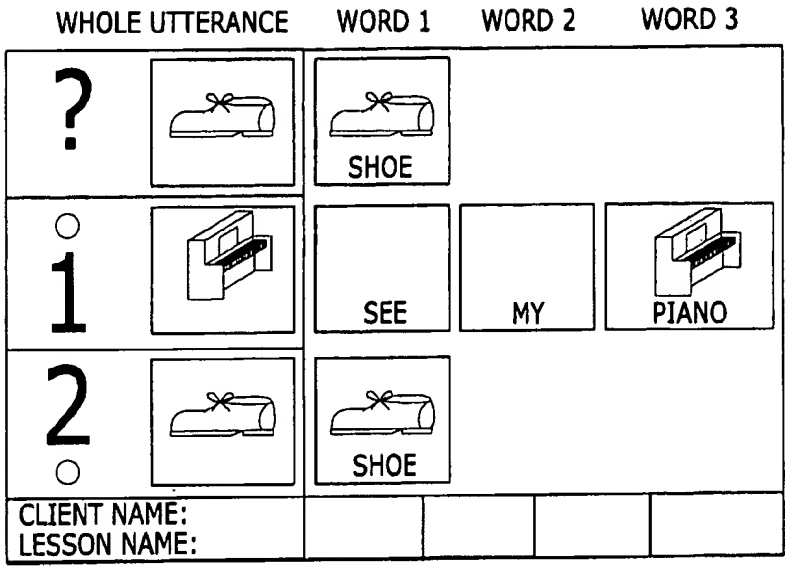
SYLLABLE NUMBER
PATTERN PERCEPTION

Fig. 21C



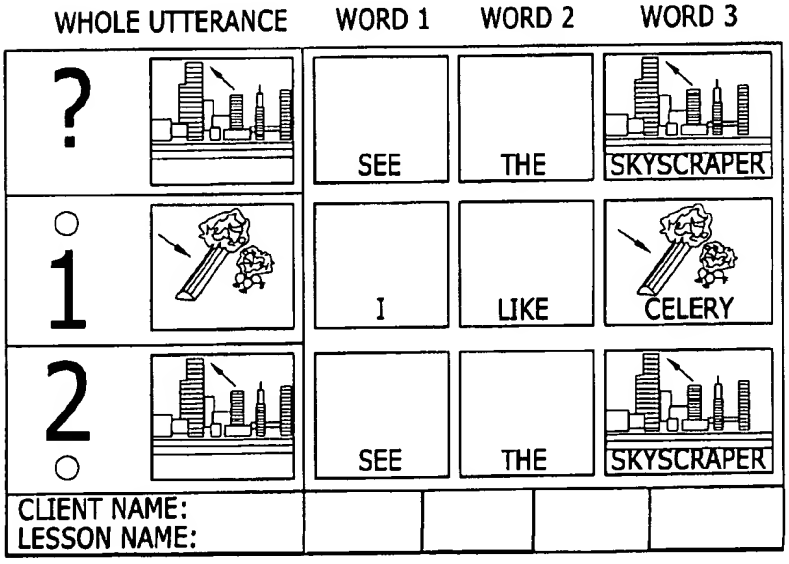
STRESS
PATTERN PERCEPTION

Fig. 21D



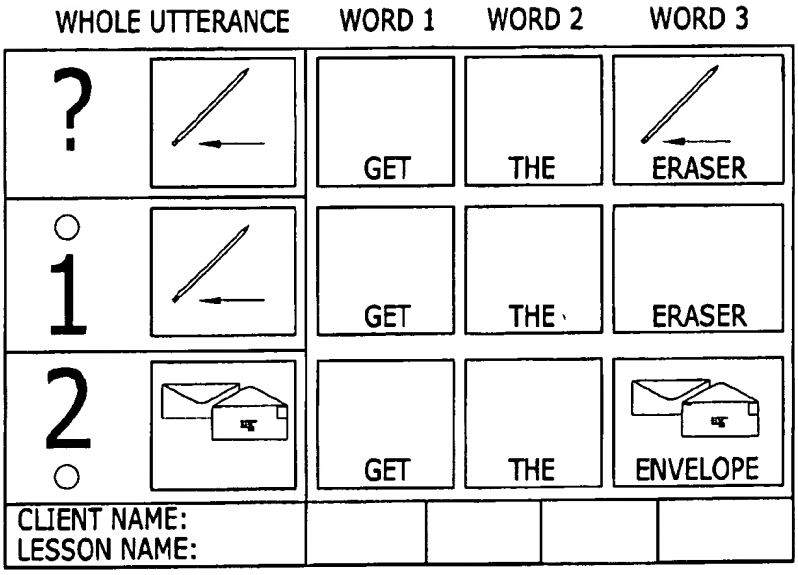
MIXED WORDS & SENTENCES
WORD PERCEPTION

Fig. 21E



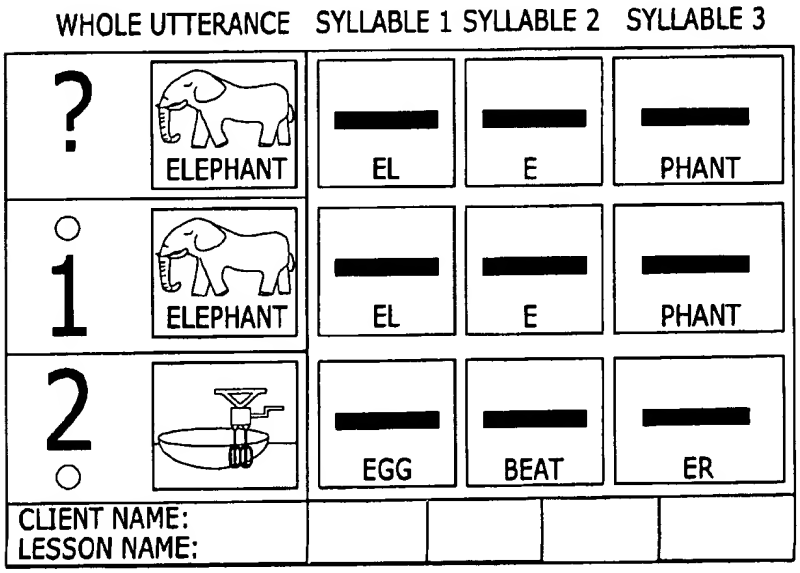
DIFFERENT SENTENCES
WORD PERCEPTION

Fig. 21F



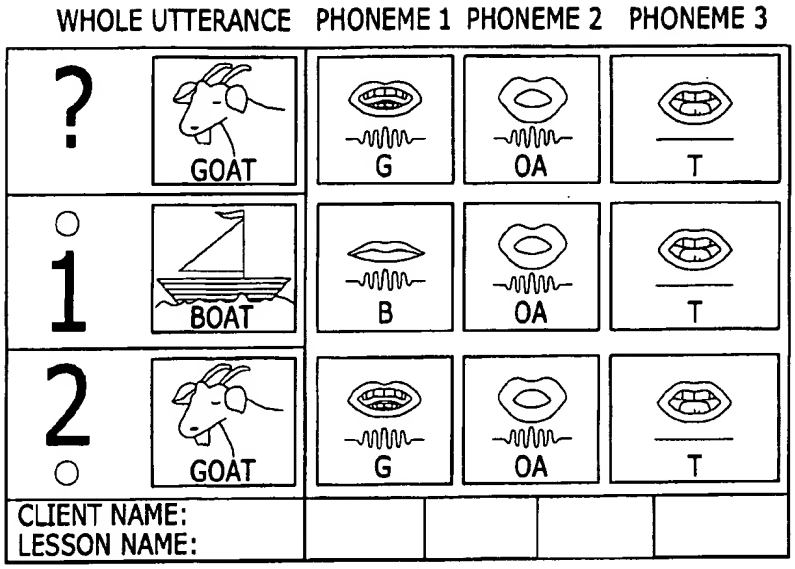
SAME SENTENCES
WORD PERCEPTION

Fig. 21G



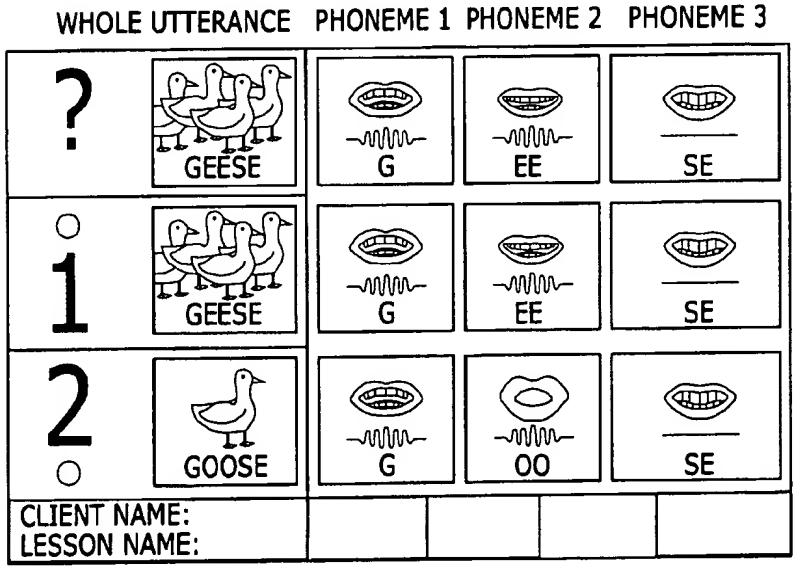
WORDS-SYLLABLE LEVEL
SYLLABLE PERCEPTION

Fig. 21H



WORDS-CONSONANT FEATURES
PHONEME PERCEPTION

Fig. 21I



WORDS-VOWEL DIFFERENCES
PHONEME PERCEPTION

Fig. 21J

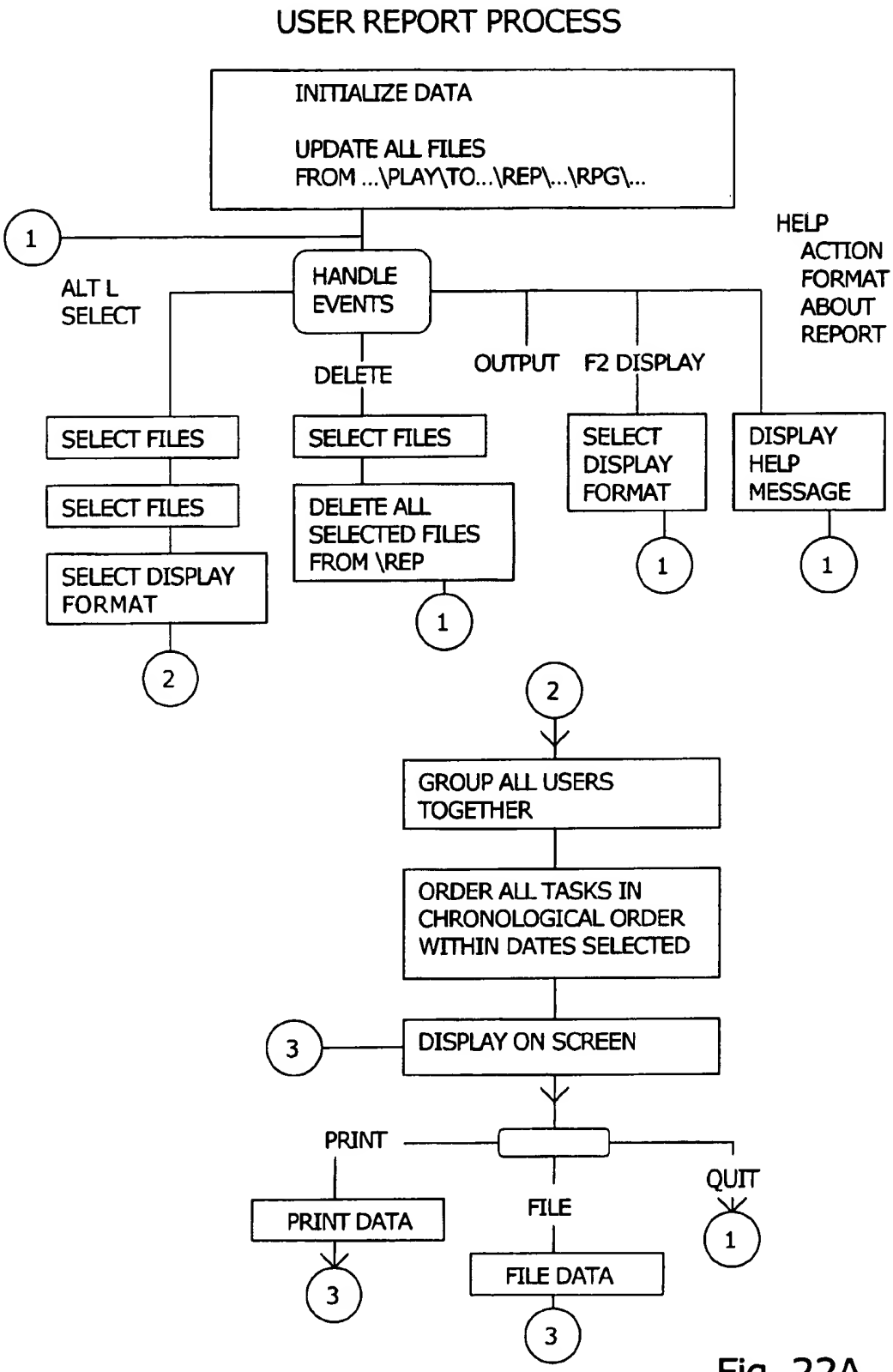

USER REPORT PROCESS
INITIALIZE DATA
UPDATE ALL FILES
FROM ...\PLAY\TO...\REP\...\RPG\...
1
HANDLE EVENTS
ALT L SELECT
DELETE
OUTPUT
F2 DISPLAY
HELP
ACTION
FORMAT
ABOUT
REPORT
SELECT FILES
SELECT FILES
SELECT DISPLAY FORMAT
2
SELECT FILES
DELETE ALL SELECTED FILES FROM \REP
1
SELECT DISPLAY FORMAT
1
DISPLAY HELP MESSAGE
1
2
GROUP ALL USERS TOGETHER
ORDER ALL TASKS IN CHRONOLOGICAL ORDER WITHIN DATES SELECTED
3
DISPLAY ON SCREEN
PRINT
FILE
QUIT
PRINT DATA
3
FILE DATA
3
1

Fig. 22A

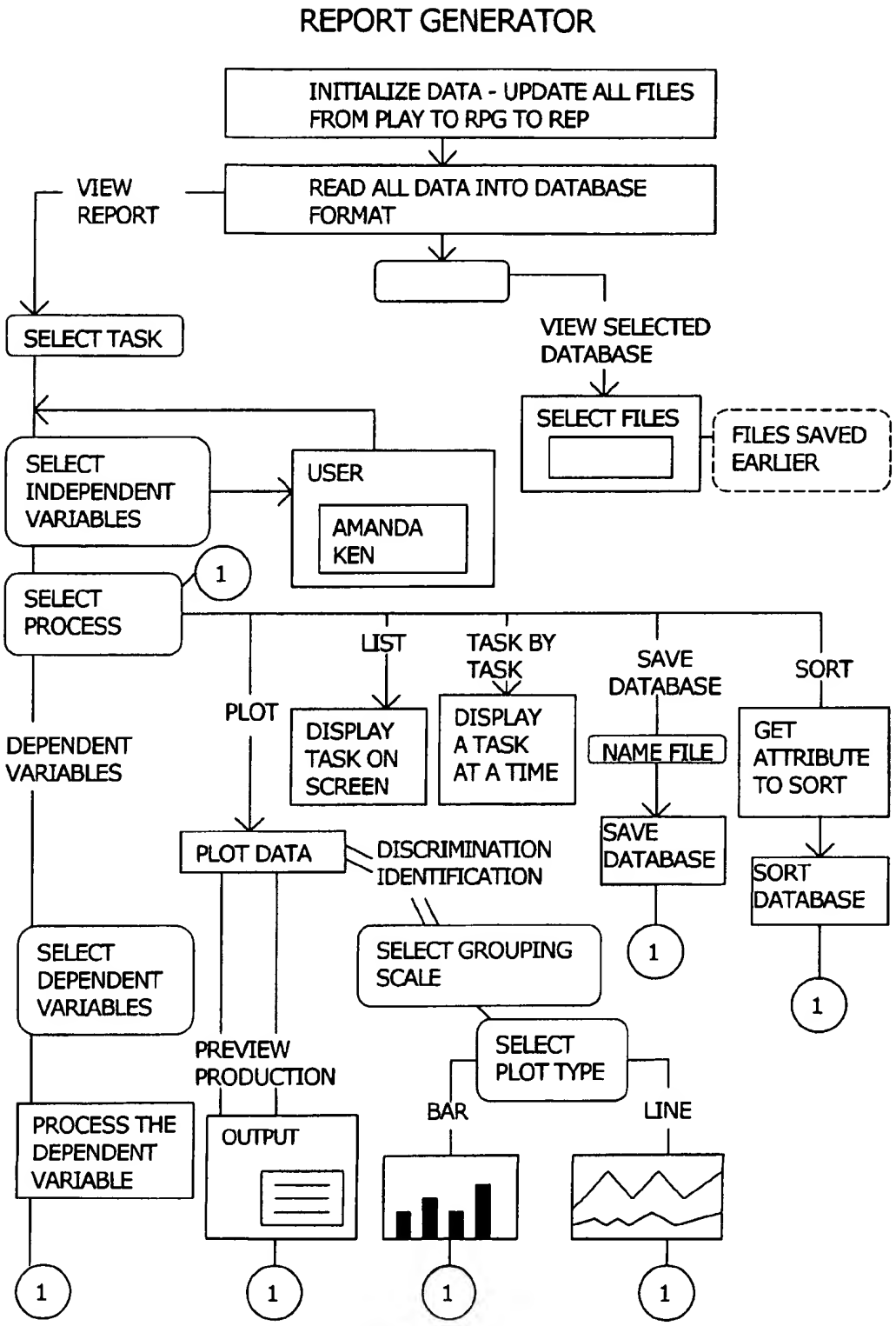
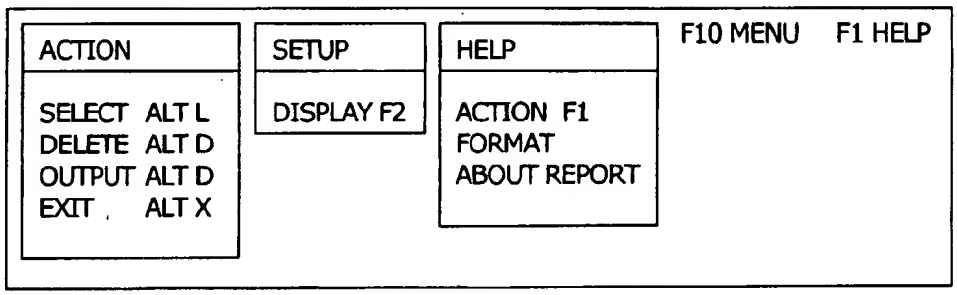

REPORT GENERATOR
INITIALIZE DATA - UPDATE ALL FILES FROM PLAY TO RPG TO REP
READ ALL DATA INTO DATABASE FORMAT
VIEW REPORT
SELECT TASK
VIEW SELECTED DATABASE
SELECT FILES
FILES SAVED EARLIER
SELECT INDEPENDENT VARIABLES
USER
AMANDA
KEN
SELECT PROCESS
1
LIST
TASK BY TASK
SAVE DATABASE
SORT
PLOT
DISPLAY TASK ON SCREEN
DISPLAY A TASK AT A TIME
NAME FILE
GET ATTRIBUTE TO SORT
DEPENDENT VARIABLES
PLOT DATA
DISCRIMINATION
IDENTIFICATION
SAVE DATABASE
SORT DATABASE
SELECT DEPENDENT VARIABLES
SELECT GROUPING SCALE
1
1
PREVIEW PRODUCTION
SELECT PLOT TYPE
BAR
LINE
PROCESS THE DEPENDENT VARIABLE
OUTPUT
1
1
1
1

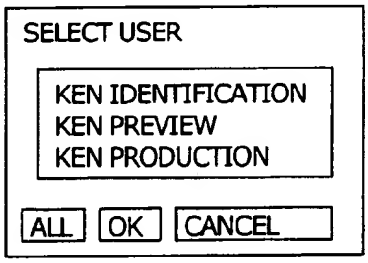
Fig. 22B

USER REPORT MENUS

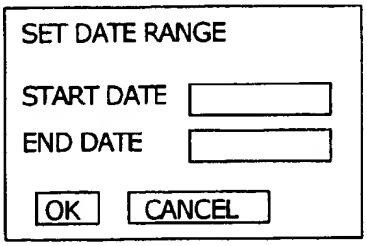
INITIAL SCREEN



USER SELECTION



DATE SELECTION



DISPLAY SELECTION

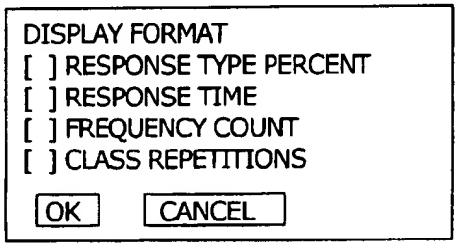
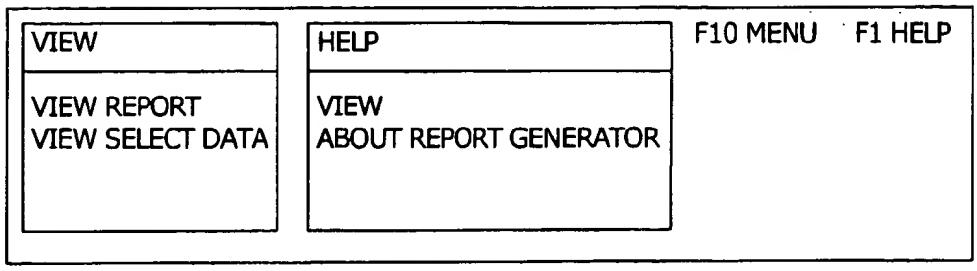


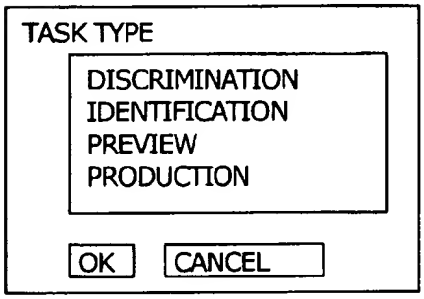
Fig. 22C

REPORT GENERATOR MENUS

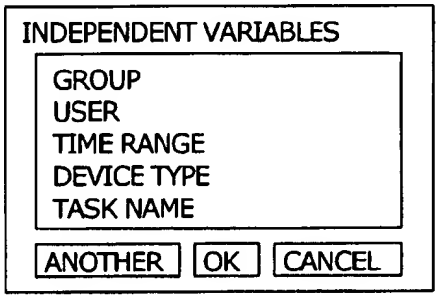
INITIAL SCREEN



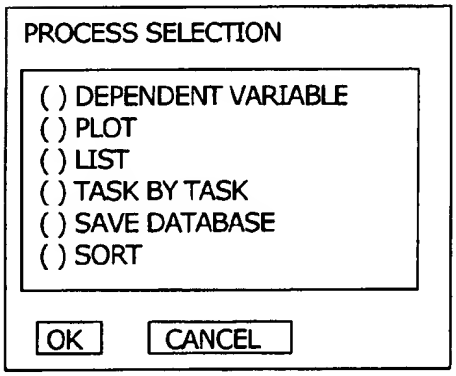
TASK SELECTION



INDEPENDENT VARIABLE SELECTION



PROCESS SELECTION



DISPLAY SELECTION

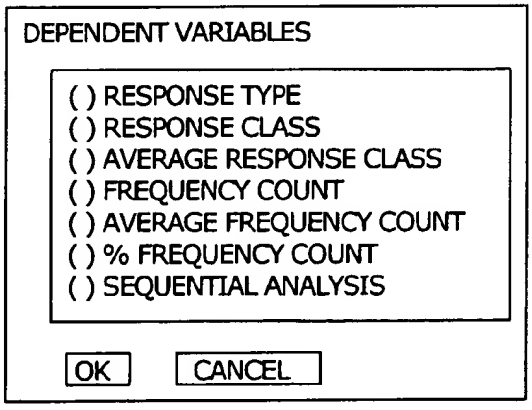


Fig. 22D

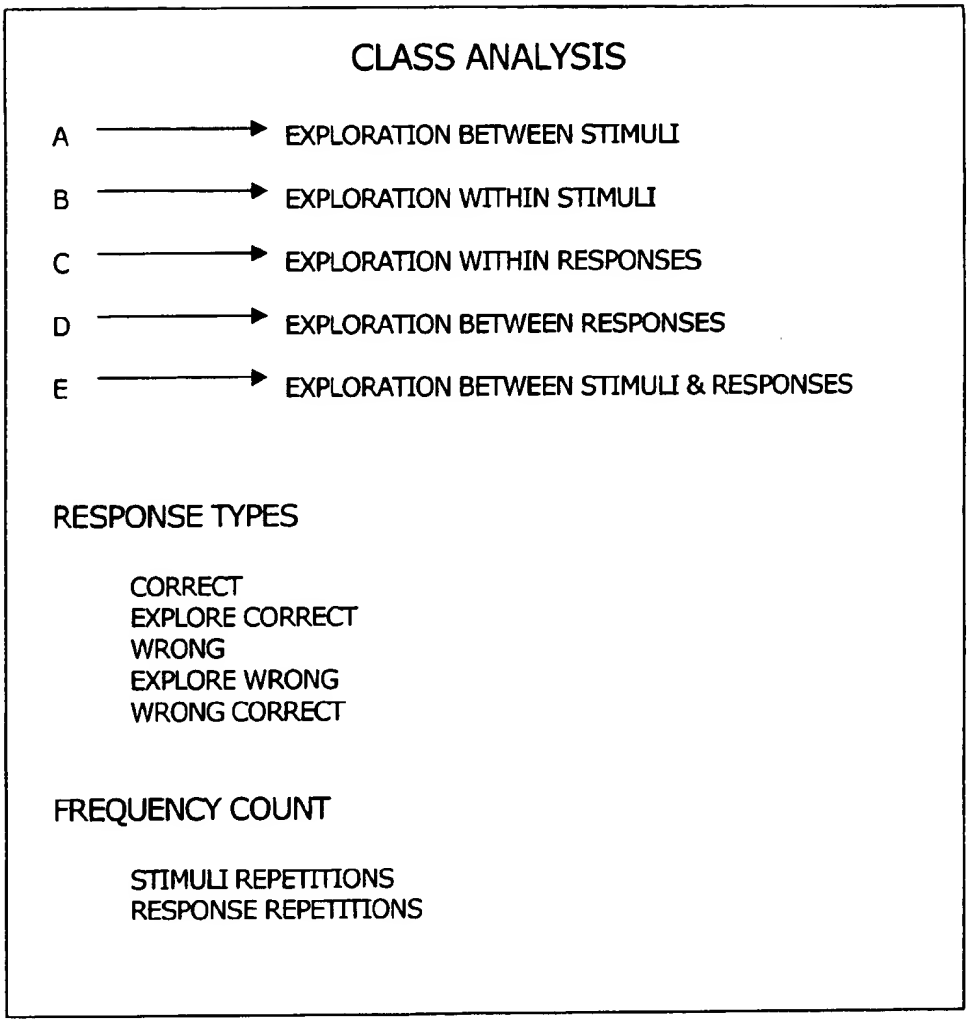

CLASS ANALYSIS
A → EXPLORATION BETWEEN STIMULI
B → EXPLORATION WITHIN STIMULI
C → EXPLORATION WITHIN RESPONSES
D → EXPLORATION BETWEEN RESPONSES
E → EXPLORATION BETWEEN STIMULI & RESPONSES
RESPONSE TYPES
CORRECT
EXPLORE CORRECT
WRONG
EXPLORE WRONG
WRONG CORRECT
FREQUENCY COUNT
STIMULI REPETITIONS
RESPONSE REPETITIONS

Fig. 22E

RESPONSE TYPES — EXAMPLES OF DATA OUTPUT, DISCRIMINATION TASK

CORRECT — SAME

CLASS	A	A	A	B	B	B	A	B	B	B	
EXPLORE-CORRECT	S1	S11	S12	S13	S2	S1	S2	S21	S12	S22	S12
	MOON	M	OO	N	MEAN/MOON/MEAN			M	OO	EA	OO

CLASS	A	A	A	A	A	B	A	A	A	B	
EXPLORE-CORRECT	S1	S11	S11	S12	S11	S13	S2	S23	S22	S21	S12
	MOON	M	M	OO	M	N	MEAN	N	EA	M	OO

WRONG — DIFFERENT

EXAMPLES OF DATA OUTPUT, MATCHING TASK

CORRECT — R1

CLASS	E	E	E	A	E	C	D	E	E	D	E
EXPLORE-CORRECT	R1	S1	R2	S1	S1	R1	R11	R21	S1	R1	R2	S1

CLASS	C	C	E	A	A	E	C	C	C	C	
EXPLORE-WRONG	R2	R21	R22	S1	S11	S12	R1	R12	R11	R13	R1

WRONG — R2

CLASSES

--WITHIN-STIMULI COMPARISONS

--BETWEEN-STIMULI COMPARISONS

--WITHIN-RESPONSE COMPARISONS

D--BETWEEN-RESPONSE COMPARISONS

E--BETWEEN-STIMULI & RESPONSE COMPARISONS

Fig. 22F

2A. SEQUENTIAL ANALYSIS, DISCRIMINATION TASK

AVERAGE "WITHIN-STIMULI" COMPARISONS IN A RUN;

AVERAGE "BETWEEN-STIMULI" COMPARISONS IN A RUN;

PROPORTION OF WITHIN/BETWEEN COMPARISONS;

PROPORTION OF WITHIN/BETWEEN RUNS;

2B. SEQUENTIAL ANALYSIS, MATCHING ID TASK

AVERAGE "WITHIN-STIMULI" COMPARISONS IN A RUN;

AVERAGE "WITHIN-RESPONSE" COMPARISONS IN A RUN;

AVERAGE "BETWEEN-RESPONSE" COMPARISONS IN A RUN;

AVERAGE "BETWEEN-STIMULI AND RESPONSE" COMPARISONS IN A RUN;

PROPORTION OF WITHIN/BETWEEN COMPARISONS;

PROPORTION OF WITHIN/BETWEEN RUNS;

Fig. 22G

DATE: 04/02/1993 PAGE: 1

Fig. 22H

NAME:
SUBJECT: 1
DEVICE: HEADPHONES

			C	EC	EW	W	WC	CLASS	TYPE
M1C-1I									
IPREE5									
02/03/93	2:31 PM	RESP PERCENT	66.67	16.67	16.67	0.00	0.00	A:	0
		RESP TIME	56.35	19.39	18.84	0.00	0.00	B:	1
		STIM REP	0	1	2	0	0	C:	0
		RESP REP	0	0	0	0	0	D:	0
								E:	0
			C	EC	EW	W	WC	CLASS	TYPE
M1C-1I									
IDA2		RESP PERCENT	0.00	100.00	0.00	0.00	0.00	A:	0
02/03/93	2:34PM	RESP TIME	0.00	65.91	0.00	0.00	0.00	B:	16
		STIM REP	0	28	0	0	0	C:	20
		RESP REP	0	41	0	0	0	D:	7
								E:	20
			C	EC	EW	W	WC	CLASS	TYPE
M1C-1I									
IDA3		RESP PERCENT	0.00	83.33	0.00	0.00	16.67	A:	0
02/03/93	2:43PM	RESP TIME	0.00	64.58	0.00	0.00	4.01	B:	12
		STIM REP	0	19	0	0	3	C:	18
		RESP REP	0	32	0	0	7	D:	8
								E:	16
			C	EC	EW	W	WC	CLASS	TYPE
L23-1I									
IPREE5		RESP PERCENT	0.00	100.00	0.00	0.00	0.00	A:	0
02/04/93	1:53PM	RESP TIME	0.00	51.57	0.00	0.00	0.00	B:	0
		STIM REP	0	6	0	0	0	C:	0
		RESP REP	0	6	0	0	0	D:	0
								E:	6
			C	EC	EW	W	WC	CLASS	TYPE
L3E-1I									
IPREE5		RESP PERCENT	0.00	100.00	0.00	0.00	0.00	A:	0
02/04/93	1:57PM	RESP TIME	0.00	27.31	0.00	0.00	0.00	B:	0
		STIM REP	0	6	0	0	0	C:	0
		RESP REP	0	6	0	0	0	D:	0
								E:	6
			C	EC	EW	W	WC	CLASS	TYPE
L23-1I									
IPREE5		RESP PERCENT	0.00	100.00	0.00	0.00	0.00	A:	0
02/04/93	2:01PM	RESP TIME	0.00	24.51	0.00	0.00	0.00	B:	0
		STIM REP	0	6	0	0	0	C:	0
		RESP REP	0	6	0	0	0	D:	0
								E:	6
			C	EC	EW	W	WC	CLASS	TYPE
L3E-1I									
IPREE5		RESP PERCENT	0.00	50.00	50.00	0.00	0.00	A:	0
02/04/93	2:06PM	RESP TIME	0.00	17.34	11.27	0.00	0.00	B:	0
		STIM REP	0	3	3	0	0	C:	0
		RESP REP	0	3	3	0	0	D:	0

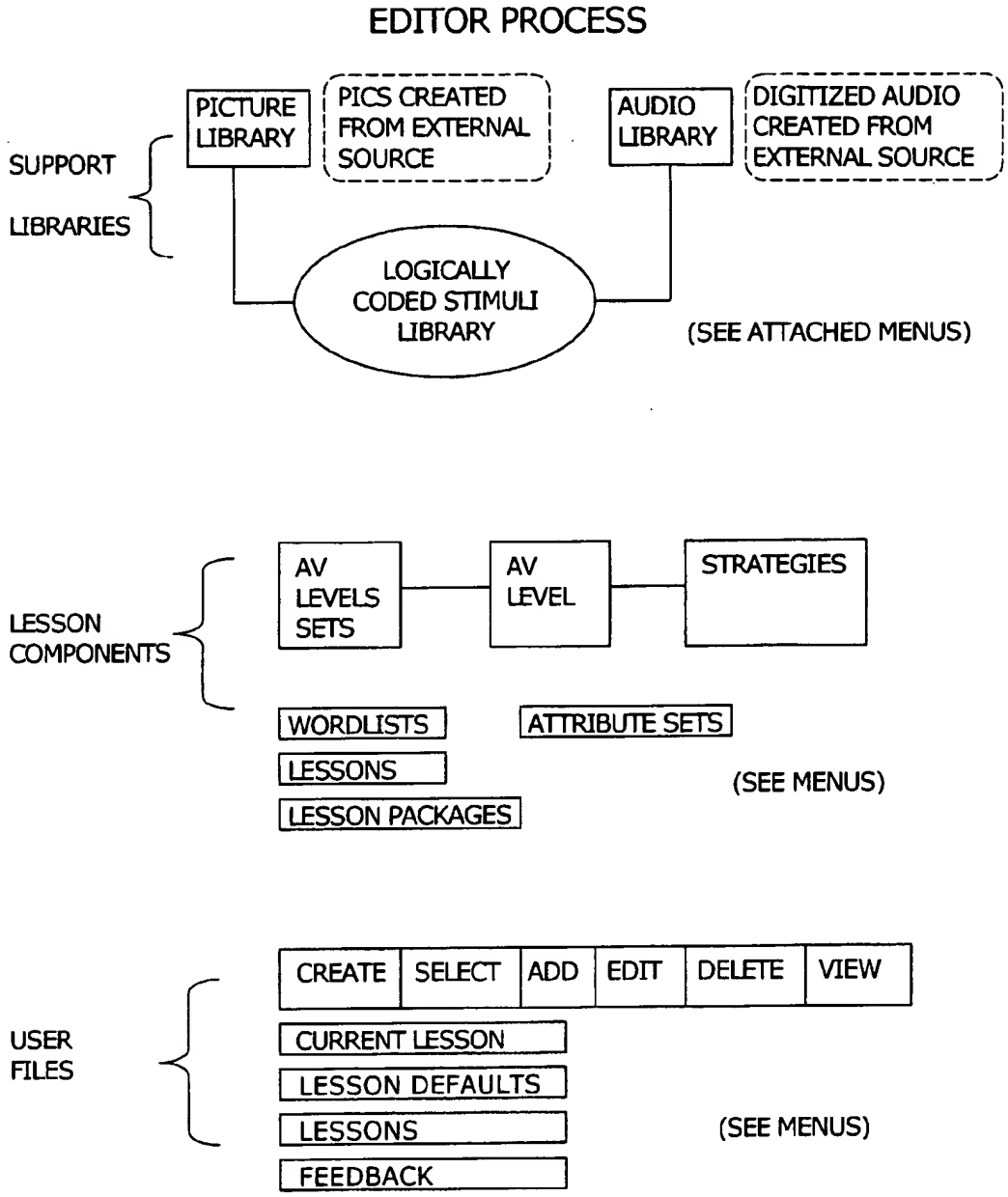

EDITOR PROCESS
SUPPORT
LIBRARIES
PICTURE LIBRARY
PICS CREATED FROM EXTERNAL SOURCE
AUDIO LIBRARY
DIGITIZED AUDIO CREATED FROM EXTERNAL SOURCE
LOGICALLY CODED STIMULI LIBRARY
(SEE ATTACHED MENUS)
LESSON COMPONENTS
AV LEVELS SETS
AV LEVEL
STRATEGIES
WORDLISTS
ATTRIBUTE SETS
LESSONS
LESSON PACKAGES
(SEE MENUS)
USER FILES
CREATE
SELECT
ADD
EDIT
DELETE
VIEW
CURRENT LESSON
LESSON DEFAULTS
LESSONS
FEEDBACK
(SEE MENUS)

Fig. 23

APPARATUS FOR INTERACTIVE ADAPTIVE LEARNING BY AN INDIVIDUAL THROUGH AT LEAST ONE OF A STIMULI PRESENTATION DEVICE AND A USER PERCEIVABLE DISPLAY

BACKGROUND OF THE INVENTION

A. Field of the Invention

The present invention relates to the field of learning assistance tools and techniques, and in particular, to computerized systems that can be used in training or learning programs for such things as hearing, speech, reading, writing, mathematics, and language skills.

B. Problems in the Art

Through history many attempts have been made to facilitate more efficient learning of what will be called rule-based systems. Examples are speech and language skills, and mathematical skills. Historically, and yet today, the most conventional learning methods use repetitive, rote learning, which includes teacher/student interaction.

For example, teaching of reading or writing generally involves repetitive exercises by the learner, beginning with very basic, simple tasks and progressing through more and more difficult tasks. This obviously is "labor" intensive, both from the standpoint of the learner and any teacher or assistant that is monitoring or assisting in the learning exercises. Teachers must spend significant amounts of hands-on time, particularly with students that have special needs or learning difficulties.

This type of "manual" learning training is therefore time and resource intensive. It also is susceptible to a certain amount of subjectivity on the part of either student or teacher. Still further it relies significantly on the discipline, interest, and skills of student and teacher.

A more concrete example is as follows. A young student with hearing impairment is to begin to learn to decode spoken language. A teacher, with or without the assistance of recorded sound, repetitively presents spoken words to the student and attempts to train recognition of spoken language. Pictures or other perceivable information can be manually presented to the student along with the spoken words. The teacher decides the pace and content of each lesson and controls the progression of the student subjectively.

The time and effort of the teacher is critical to success of the program. Such valuable one-on-one learning is extremely valuable, and therefore difficult to obtain for a wide range of students. Therefore, one-on-one teaching time is in many cases by necessity essentially rationed. Students are left to practice or train on their own, or without expert assistance. A deficiency in this arrangement is the lack of supervision and the reliance on the individual for progress. Still further, standardized training materials may not function well for students with atypical or problematic learning or perception skills.

Attempts at improvement in this area have involved development of somewhat automated or computerized training systems. A substantial number of interactive computerized systems are based primarily on game-type exercises which present tasks which demand a right or wrong answer. The student simply takes the "test" and is scored on the number of right or wrong answers. The primary deficiency in such systems is the lack of flexibility for students with different learning styles or capabilities.

Such a student just may not function efficiently in a stark "right" or "wrong" question/answer system.

Still further, such present day interactive systems are somewhat limited in that they are directed only to fairly narrow, limited aspects of learning or training relating to certain subject matter.

Systems have therefore been developed, called individual learning systems (ILS) that attempt to tailor the learning task to individual students. These systems are still based primarily on right or wrong answers, and even though somewhat individualized, are not as flexible as might be desired.

The present state of the art therefore lacks flexibility. There is no satisfactory system that can be used for wide variety of individualized problems or learning skills, or which is applicable to a wide range of standard course contents or a wide variety of courses. Still further, the state of the art has room for improvement in the way special learning problems are handled. In effect, many allegedly high technology individualized computerized systems may be no better, or even worse than, training on a one-on-one basis with a human teacher.

Additionally, a need exists in the art for a powerful training and learning system that is integratable with a number of different learning tasks and subject matter. A need exists with regard to efficiency in terms of economical allocation of resources, speed in terms of providing the most efficient progress for individualized learning skills, incentive in terms of providing motivation for learners and/or teachers to succeed and progress at the most beneficial rate; all to maximize the learning potential and success for the least amount of time and dollars.

It is widely acknowledged that education is truly a key to many facets of life. In fact, education is and historically has been, in the United States and many countries, a leading public policy priority. Therefore, improvements in the ability to provide learning, from the standpoint of meaningful success for the students, as well as efficient allocation of resources towards that end, should be a primary goal of all levels of government and its citizens. Studies have shown that one root of illiteracy is lack of foundational learning and training by the first grade level. A need therefore exists regarding efficient and effective training of pre-reading skills for first graders and even kindergartners. The ability of children this age to self-teach is minimal. Therefore, an effective automated learning assistance system would be of tremendous value to children, as well as society in general, if viewed from a long-term perspective.

Additionally, there is great need and increasingly reduced resources for assisting in learning for deaf or the hearing impaired, particularly younger children who would value greatly from speech perception and reading training.

C. Objectives and Advantages of the Invention

It is therefore a principle object and advantage of the present invention to provide an interactive learning assistance system which improves upon the state of the art or solves many problems in the state of the art.

Other objects and advantages of the present invention are to provide a system as above described which:

Allows most efficient learning, and accommodates different ways of learning both for normal and problem learners.

Provides a process-oriented learning training system rather than simply right/wrong learning training.

Provides a system that is dynamic in the sense that it is self-adjusting to different learners' speeds, styles, and needs.

Is multisensory and perceptually based.

Allows discovery and exploration for learning rather than imposed rules for learning.

Does not focus on a presumed learning technique for everyone.

Is truly individualized for each learner.

Is flexible but integrateable to many applications and needs.

Allows selection or imposition of various performance strategies and levels.

Provides for on-call reporting to allow evaluation of progress and changing of strategies at any time.

Allows continuous and comprehensive recordation of user responses to derive learning styles along with performance criteria.

Can be used for a variety of learning, including speech perception, vocabulary, reading, mathematics, geography, language (English and foreign) and other rule-based subject matter.

Empowers efficiency in learning including improved speed in learning which translates into more efficient use of time and money.

Is substantially automated and automatic in its dynamic adjustment to learning styles.

Allows a number of options and features which can enhance learning, for example, interjecting background noise over speech recognition training stimuli for those who are hard of hearing.

These and other objects, features, and advantages of the invention will become more apparent with reference to the accompanying specification and claims.

SUMMARY OF THE INVENTION

The present invention, in its broadest sense, relates to a system that can be used to transfer learning. It relates to learning assistance, particularly for rule-based systems. Examples are speech, reading, math, and languages. The student interacts with a computer. A user interface includes a computer display, some type of stimuli presentation device (visual, auditory, or otherwise), and a manually operable response device such as a keyboard, touch screen, or mouse. Software presents a series of logically coded analytical units (stimuli) to the user. These analytical units are taken from a predetermined set of core stimuli which can consist, for example, of sentences, words, sounds, images, etc.

The user is presented with tasks, for example to compare two stimuli and respond whether they are the same or different. The software allows the user to explore or discover information about the two stimuli before making a decision by allowing the user to selectively access further information regarding the stimuli. Different levels of difficulty of the tasks are available. Difficulty levels can be presented based on the amount of sub-information made available to the user regarding any stimuli, the difficulty of the task, time limits imposed on completing the task, rate of progression from less difficult to more difficult, and other criteria.

To begin a session, the range of level of difficulty is determined for a user. Access to a given amount of information regarding the task can either be selected by an instructor, or the software will test the user and automatically select a beginning level. Thereafter, the system will continuously and comprehensively monitor the performance of the user and provide feedback, not solely on success-rate based on right or wrong responses, but also on type of response, the time it takes to respond, and the specific discovery and answering strategy utilized.

The user's performance therefore is continuously, essentially in real time, analyzed by comparison to standardized and preset goals or criteria based on right/wrong criteria, but also on non-right/non-wrong criteria. As a result of that feedback, the pre-selected strategies and progression plan will be adjusted. Essentially, tasks can be made more or less difficult depending on performance and method of performance. The level of difficulty can be changed not only as to the subject matter of the stimuli, but also in more subtle aspects, such as rate of progression in each lesson, the amount of information available for exploration and discovery for each task, the type of information made available to discover, etc.

Software therefore automatically and dynamically sets and controls strategy and movement of the student through series of lessons. Performance is recorded and quantified. The user has a significant amount of control and can explore and discover to match his/her own learning strategies and techniques. A teacher can at any time request a report on performance and subjectively alter the learning strategy and movement for the student. Still further, software allows as an option the ability for a teacher or instructor to customize lessons for individualized students.

The invention therefore presents a learning training system which allows the efficient utilization of teacher or expert supervision, while presenting to a user a learning training tool for intense, long period, repetitive learning tasks which conforms to the learning styles of the individual and therefore is more likely to be motivating and pleasurable to utilize.

The invention has a number of options or enhancements that will be discussed in more detail later.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of the hardware components for a preferred embodiment according to the present invention.

FIG. **2** is a block diagram of the overall architecture of the software of FIG. **2**.

FIGS. **3**A–**3**D are Flow charts of portions of programming related to the preferred embodiment.

FIG. **4**A is a diagram of the general format for screen displays for training tasks regarding the preferred embodiment of the invention.

FIG. **4**B is a specific screen display for a discrimination task according to the preferred embodiment of the invention.

FIG. **4**C is a specific example of a screen display for an identification task for the preferred embodiment of the invention.

FIG. **5** is a screen display providing an example of a word list for the preferred embodiment.

FIG. **6**A is a collection of screen display examples for varying attributes according to the preferred embodiment.

FIG. **6**B is a further collection of screen display examples for attributes of the preferred embodiment.

FIG. **7** is a display and legend key for the various auditory visual levels for either identification tasks or discrimination tasks.

FIGS. **8**A–**8**F are screen displays for the various auditory visual levels for discrimination tasks as set forth in FIG. **7**.

FIG. **9** is a display of the various strategy types for the preferred embodiment.

FIG. **10** is an exemplary screen display for a preview task.

FIG. **11** is an exemplary display for a production training task.

FIG. **12**A is an exemplary screen display of a puzzle feedback.

FIG. 12B is an exemplary display for painting feedback.

FIG. 13 is a screen display for selecting a speech perception level for a user.

FIGS. 14A–14D are screen displays for selecting lesson levels for a user.

FIG. 15 is a screen display for selecting a task for a user.

FIG. 16 is a screen display for selecting a strategy for a user.

FIG. 17 is a screen display for selecting a level of audiovisual support for a user.

FIG. 18 is a screen display for selecting specific tasks for a user.

FIG. 19 is a screen display for selecting certain parameters for testing a user.

FIGS. 20A–20L are screen displays relating to creating a user file for an individual user.

FIGS. 21A–21J are examples of various screen displays for different perception tasks according to the preferred embodiment of the present invention.

FIGS. 22A and 22B of flow charts for the user report process and report generator according to the preferred embodiment of the present invention.

FIGS. 22C and 22D are examples of user report menus and report generator menus according to a preferred embodiment of the invention.

FIG. 22E is a chart showing class analysis, response types frequency count according to the preferred embodiment of the present invention.

FIGS. 22F–22H are examples of data output, output calculations, and output reports according to the preferred embodiment of the present invention.

FIG. 23 is a block diagram of the editor process available with the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

A. Overview

To assist in a better understanding of the invention, a preferred embodiment will now be described in detail. It is to be understood that this preferred embodiment is but one form the invention can take and is not exclusive of the forms that are possible.

The drawing figures will be referred to throughout this description. Reference numerals and/or letters will be used to indicate certain parts or locations in the drawings. The same reference numerals will be used to indicate the same parts or locations throughout the drawings unless otherwise indicated.

B. General Environment of the Preferred Embodiment

The example given by this preferred embodiment is particularly relevant to the teaching of young children (kindergarten or first graders) and/or children with hearing loss (either total or partial), or children with other types of perception impairments, such as learning disabilities. It is therefore to be understood that the concepts discussed would be by analogy applicable to any learning training, regardless of age, capabilities, or impairments; and particularly to learning of rule-based systems such as speech, reading, language (English and others), math, and the like.

As will be described in more detail below, the preferred embodiment entails a computer-based interactive system. In the above described environment with regard to learning by relatively small children, a teacher or speech/hearing professional is generally involved to initialize and monitor the training. However, the invention certainly can be used at home by non-technically trained persons.

Still further it is to be understood that the specific example discussed has some subtle concepts which are generally well known to those in this art, although some will be brought out here to assist those relatively unskilled in the art. First, the learning training discussed is many times very fundamental and highly repetitive. For example, a deaf child trying to distinguish between the sound of a one syllable word and environmental noise such as a car horn or a dog bark, must start at a very fundamental level. The student would be given intensive repetitive tests where the stimuli were simple one syllable words compared to non-speech sounds. Through long period, repetitive training, the child will begin to distinguish the same. This will lay the foundation for movement to more difficult differentiations; for example multi-syllable words or sentences compared to multi-syllable words or sentences of different makeup. One of the main advantages of the present invention is to allow such sometimes tedious, intensive work to be marshalled autonomously by the computer system while maintaining a level of motivation and interest in the user. This allows the teacher, professional, or parent the ability to ration their attention, while maintaining the interest of the user, and in fact, providing the user with the level of difficulty needed for the user's particular needs.

The following description will be broken down into these segments. First, a basic discussion of a preferred hardware system will be set forth. Thereafter, a high level description of the software of the preferred embodiment will be given. This will be followed by a specific discussion of various fundamental concepts utilized in the system. Thereafter a specific example of operation of the system will be set forth with reference to various examples of data and stimuli that are useful for these purposes. Finally, a discussion of options, alternatives, and features of the invention will be given.

C. Hardware

FIG. 1 diagrammatically depicts a basic hardware setup according to the preferred embodiment of the invention. What will be called collectively system **10** includes a computer processor **12** which is preferably an IBM or IBM compatible 386 microprocessor with four megabyte RAM and an 80–100 megabyte hard drive capacity. System **10** can work with a minimum of a 286 microprocessor with 640 K-RAM and 60 meg hard drive. For institutional use a 386 DX/25+, 8 mega byte RAM, 100–200 megabyte hard disk is recommended.

An EGA-VGA adapter and monitor **14** are preferred as the visual display component of the multi-perceptual system **10**. Monitor **14** comprises a part of what will be called the user interface to system **10** which includes not only monitor **14** for presentation of visual stimuli and information readout, but also a user input that can consist of either a touch screen **16** (Edmark Corporation Touch Window) available from a variety of vendors; a mouse **18**, such as is well known in the art; or a keyboard **20**. In the preferred embodiment all three components can be used to facilitate not only user input but also operation of the programming and entry of data.

A sound stimuli component for the user interface consists of a speaker **22** (in the preferred embodiment a bookcase size speaker) that is interfaced to processor **12** by a Covox sound board available from Covox, Inc. 675 Conger Street, Eugene, Oreg. 97402 (see reference numeral **24**). Optional components related to auditory stimuli can include standard head phones **26** placeable on user **28**; or a cochlear input selector **30** which is attachable to a cochlear implant in a user; or a vibrotactile device **32** which is connectable to a

vibratory transducer that could be used by a user. A microphone **36** can also be included.

As is known to those skilled in the art, each of those auditory components could be used for presenting sound to a user. Speaker **22** and headphones **26** would present sound as is normally understood; whereas the cochlear implant and vibrotactile devices would present it in a electrical or vibrational mode to those who are deaf or have a hearing impairment.

FIG. **1** also shows security key disk **34** (from Dallas semiconductor), such as is well known in the art, is useful in limiting access to system **10**. System **10** will not operate unless the key disk **34** is inserted, for example, in the parallel port on processor **12**. Furthermore, it can contain initialization information regarding the user which can facilitate easy start up and use of system **10**. An alternative is to require users to utilize a pass word which is keyed in on keyboard **20**.

It is further noted that in the preferred embodiment, a comprehensive manual would be given to the user of system **10** to assist installation of the programming, hookup of the hardware, and initialization and use for a variety of users and purposes.

D. Software Configuration

FIG. **2** depicts diagrammatically the high level structure of software according to the preferred embodiment of the present invention, and its use of memory.

The software runs on MS-DOS and is written in Turbo C and C+ language.

A floppy disk is supplied with the programming and is installed into computer **12** as is conventional and within the skill of those of ordinary skill in the art. For example, floppy would be inserted into drive A, the enter key pressed, and INSTALL typed in and again the enter key pressed. Approximately 4 megabytes of space are needed in RAM and 60–80 meg on the fixed drive for the program and at least 15 files must be set up. If a printer is utilized it should be connected to the LPT1 port. By following the instructions on the screen, completion of installation of the programming can be accomplished. After these basics are installed, audio, picture, and stimuli library and supporting executables are installed in a similar manner.

What is called the core stimuli for the programming are approximately 1600 words, sounds, pictures, and the like which form the basis for the training lessons presented with system **10**. These core stimuli have been carefully selected on the basis of years of research and study, but system **10** allows the addition of customized stimuli. For example, it is known that personalized information allows better and quicker learning. Thus, picture stimuli that have a personal connection to any learner, (including small children) can be added to the core stimuli according to known in the art methods. Likewise words, sounds, and other stimuli can be added in.

As will be discussed in more detail later, different courses can be offered with system **10**. In this preferred embodiment, a course on listening will be described. Different courses on listening, or courses dealing with pre-reading and reading subject matter can be separately installed and utilized. As previously mentioned, courses on mathematics, geography, and the like could also be prepared.

As will be further described below, memory also contains a plurality of different lessons for each specific course to allow variety for the user as well as varying levels of difficulty. In the preferred embodiment approximately 1000 lessons are utilized.

E. Software Overview

By referring to FIGS. **2** and **3A–3D** a high level diagram of the construction and interrelationship of the software according to the preferred embodiment is shown. As previously explained, various courses would be possible. In this embodiment course **1** dealing with listening is specifically discussed.

Under each course is a plurality of lesson packages. Each lesson package (in the preferred embodiment approximately 160 lesson packages) would involve between 1 to 15 lessons. System **10** has about 1,000 lessons available to it.

For the listening course each lesson would generally contain one or more word lists. In this context word lists can mean words, combinations of words, sentences, non-speech sounds, or any auditory stimuli.

As shown at FIG. **2**, the lessons can also consist of feedback, libraries, mode, and tasks.

Therefore, when operating system **10**, a user, teacher, parent, or professional, can select from a number of different lesson packages related to the specific learning training desired for the user. As can be appreciated, the content of the lessons can cover wide variation of subject matter.

FIG. **2** specifically sets forth what is involved with each possible component of a lesson.

First of all, tasks consist of one or more of pretest, posttest, practice, training, and production. Specific examples of these will be given later. Basically the lesson can predetermine whether the user is prepared for the level of difficulty of the lesson using a pretest. It can also posttest the student to better check what has been learned. A practice component can allow the user to familiarize him or herself with the particular task. The term training refers to the actual learning process.

A production task involves a variety of tests or processes aimed at requiring the user to essentially produce a result. The production task may differ substantially from the training and is incorporated as an optional feature to go along with the listening training. One example is to have the student vocalize a word or try to match the word as sounded by system **10**.

The term "Mode" in the preferred embodiment means selection between essentially a discrimination task or an identification task. A discrimination task merely asks the user to state whether two presented stimuli are the same or different. Identification tasks present a stimuli and then ask which of two or four succeeding stimuli matches the original stimuli. A comprehension mode is also possible which presents the stimuli and then requires language comprehension to select the answer.

The "libraries" portion of each lesson relates to the specific audio visual presentations that will be available in the lesson. As can be shown, audio, pictorial, and text are either taken from pre-stored core stimuli, or as indicated by the box labeled "input from stimuli editor", can be customized and input for use. Still further, the edit feature allows editing of the existing core stimuli.

As is also shown in FIG. **2**, textual stimuli are coded into the libraries so that essentially the difficulty of their presentation can be quantified in valuing the difficulty of certain lessons. This will be discussed further below.

The feedback component of the lessons simply is any number of built-in presentations that provide reinforcing feedback and motivation to the user of system **10**. For example, a child could be rewarded periodically with a puzzle, stars, or a painting task. Older children or adults could be rewarded with something at perhaps a higher level such as a text message.

FIG. 2 also shows that an important aspect of the software is the "strategy" for the tasks and for the lesson packages of the course. In the lower right hand corner of FIG. 2, it is shown that either by customized selection, or by default settings programmed into the software, such things as ordered or random presentation of stimuli for each lesson can occur, certain performance criteria can be adjusted for each user, the level of abstraction of stimuli can be adjusted, rate of progression, and the amount of audio visual support for each task can be selected.

The strategy therefore can essentially set the initial difficulty of each lesson and then the rate of progression as far as difficulty from then on.

In the preferred embodiment, as shown in FIG. 2, software allows recordation and analysis of the entire response profile of the user for each lesson or lesson package. As will be described in more detail later, the reporting not only simply records right or wrong answers, but also codes each answer with a value correlated to the meaning of the learning strategy of the user. It also records reaction time and other criteria, other than simply the right or wrong answer. From this reporting is derived a performance profile which is compared to the performance criteria and imposed strategy. System **10** can then either autonomously (or ask the teacher or professional to) evaluate the performance and select a change in strategy (either more difficult or less difficult) or remain the same. Additionally, as the tasks are proceeding, system **10** autonomously and dynamically can change the difficulty of the tasks based on performance. The change is not necessarily isolated to the stimuli presented, but rather can vary across such subtle matters as changing the amount of time for each task, changing the level of acceptable success or failure rates, providing less or more supplemental information with which to contemplate an answer, or allowing more repetitions of certain tasks.

It is to be understood that the system is very flexible in this aspect but provides the advantage of dynamically, on the fly, monitoring a user's progress and then adjusting one or more of these sometimes subtle criteria to in turn adjust presentation of the tasks and allow the user to not only go at his/her own speed, but to discover and explore and to find his/her own best learning strategies.

FIG. 4A shows the basic flow of the program, including initialization and how the computer sets up tasks. FIG. 3A shows the basic method of "DO TASK" from FIG. 4A. FIG. 4C shows how performance is quantified to raise or lower next lesson difficulty; while FIG. 4D does this for next task.

F. Training Task Displays

FIGS. 4A–4C provide examples of the type of display that would appear on the user's screen during a training task. In FIG. 4A, the basic template for a screen display task is shown. It is important to understand that in the preferred embodiment, these templates are uniform for all tasks. The left-most column are called "top level" spaces. This is where the stimuli being compared by the user is identified. The boxes to the right of "top level" are called "attributes" and as will be further seen below, basically are features, characteristics, or sub-parts of the top level stimuli. It is important to understand that the attributes may or may not be available for review by the user in certain testing levels. If the testing is more difficult, attributes which would allow one to explore and discover more about a stimuli may not be available to make the task more difficult.

As is also indicated at FIG. 4A, the lesson name would be displayed along with the name of the current user. The trial counter segment could be a linear bar having various segments which would represent to the user the number of trials before any successful completion of a task.

Therefore, top level presentations relate to a whole stimulus, whereas the attribute sections are a presentation of a whole stimulus or abstractions of the whole stimulus. FIGS. 4B and 4C give concrete examples. For discrimination tasks FIG. 4B shows that in a touch screen situation the first top level stimulus would be presented. The user would then review the bottom top level stimulus when presented and consider whether they are the same ("S") or different ("D"). If the user believes he/she knows the answer, the S or D would be. Depending on the level of difficulty of the particular lesson, an attribute (in this case the abstraction consisting of the relative length of the word of the top level stimulus is displayed). "Boat" has a very short black bar. "Watch the elephant" has a relatively longer black bar. This helps the user in their discrimination between stimuli.

FIG. 4C shows an identification task. To the right of the question mark would be presented the top level stimuli. To the right of "1" and "2" would be presented the options for matching with the "!" stimulus. Again, attributes could be displayed to assist in the task. The user could be exposed to only attributes at either stimulus or response levels, and/or only whole stimuli at the other level, in order to force synthesis of the parts or analysis of the whole.

It is to be understood that the software allows the user to replay either the top level stimuli to encourage exploration of auditory information. The user is never penalized for requesting repetitions prior to selecting an answer. The user can also replay the attribute information and explore the variety of receptional information available before making a selection.

G. Word Lists

FIG. 5 shows an example of a word list. The word list would be used for either comparing in discrimination tasks between the opposite words, or using them in identification tasks. In FIG. 5, each left hand column word is a one syllable mixed frequency word. Each right hand column word is a three syllable mixed frequency word. This word list would therefore be available for use by lessons which would contrast one versus three syllable words with similar frequency characteristics.

As can be appreciated, a wide variety of word lists are possible. At the end of this description are provided a number of examples of different types of word lists.

H. Different Attributes

FIGS. 6A and 6B illustrate the different types of attributes available for certain top level stimuli. In FIG. 6A the top attribute is a non-speech attribute which indicates that the top level auditory stimuli in this instance is a frog croak and not a word. Such an attribute again would help the user in identifying and memorizing frog croak as a non-speech sound.

The second display indicates relative length of the phrase by use of a black bar. The third display shows as an attribute the syllables and each word of the phrase. The fourth display shows each syllable and the stress one would place when speaking each syllable.

FIG. 6B from top to the bottom shows what are called segmented attributes. For example, the words are included in

separate boxes and a picture is associated with the descriptive word "elephant". Alternatively the different words are in separate boxes with syllables represented by bars that can be called up by the user to explore and investigate before answering. Thus can be seen there are even clues that can be programmed in for investigation by the user.

FIGS. **7** and **8**A through **8**F specifically shows AV levels for discrimination tasks. Those for identification tasks are similar.

I. Strategy

FIG. **9** provides a screen display for the various strategy types that can be selected by teacher or professional, or which can be built into default settings in the software. The user's progression or regression through a series of tasks and lessons is determined by his/her own performance and how that interacts with the general strategy selected for that user initially. As can be seen in FIG. **9**, the strategy types are comprised of four elements namely (1) initial presentation (can be either "B" in which "both" stimulus and responses are displayed or "T" in which "target-only" initial presentations are displayed); (2) audio/visual set (either "A" which is auditory level only or "V" which includes visual and auditory levels); (3) type of word group (either same word group or different word group); and (4) rate of progression/regression (fast, medium, or slow).

J. Preview

FIG. **10** simply shows a screen display whereby samples of stimuli to be included in the following training tasks are shown to the user. Full auditory/visual support is provided and the user can request as many repetitions as desired. It is exploratory only and not task related.

K. Production Training

FIG. **11** illustrates a production training task as indicated in FIG. **3**. It includes three components: Listening, recording, and judging. The user can listen to a prerecorded stimulus just as if he/she were in the perception training tasks. Only one stimulus however serves as the model for production. The user can record and play back the stimulus and contrast it with the model prerecorded stimulus. The clinician or user can make a perceptual judgment about each of the user's productions by selecting one of five stars following each production. To advance to the next trial the clinician can select either "next" or "O.K.". Next represents an unacceptable production and "O.K." an acceptable production. Stars are shown for "O.K." and "balloons" for "next". The trial counter corresponds to the number of trials set and the user defaults. Stars will appear for "O.K." response.

The production training simply allows the user to practice vocalization of words or sounds, in this case, and to allow a teacher to evaluate such vocalizations.

L. Feedback

As previously mentioned, FIGS. **12**A and **12**B show two specific types of what are basically rewards that can be programmed into the software. In the preferred embodiment the feedback options are tied into the success performance of the user in the task. For each successful or correct answer on the first try, the user would receive some sort of an indication in the trial counter box at the bottom of the screen. Then periodically the feedback display would appear. Based on the number of stars in the trial counter box, the puzzle feedback of FIG. **12**A for example would break up a picture into the number of puzzle pieces which correspond to the number of stars received by the user. The user can then try to complete the puzzle using the number of pieces he/she has achieved. The number of pieces may or may not be selected to correspond to the number of first try correct answers, however. Such a puzzle is intended to try to provide motivation to the user to get as many first time correct answers as possible.

In FIG. **12**B, a similar feedback is provided. The user is allowed to use different colors to paint the picture. The amount of time the user can spend painting and how frequently this occurs can be specified in each users file.

M. Initial Selection Options

FIGS. **13**–**19** show screen displays according to the preferred embodiment of the present invention which relate to initial selections for a user related to what level and strategy of tasking is indicated for the user. In FIG. **13**, for example, the teacher or professional is presented with a series of YES or NO questions related to the indicted level of speech perception for the particular user. Depending on these answers, the teacher or professional is directed to other selection screens.

For example, regarding pattern perception, if the user is a very young child with a hearing deficiency, he/she may not be able to differentiate between speech and non-speech. If so, lessons and tasks within the lessons would have to start at a very basic level. If the child could differentiate accordingly, he/she may be able to start at a slightly higher level of lessons and tasks.

FIGS. **14**A–**14**D show similar type questionnaires which further break down the questions regarding pattern, word, syllable, and perception; again further trying to identify the potential beginning level of tasks for the user.

FIG. **15** merely asks which task mode (discrimination or identification) is desired.

FIG. **16** requests selection of strategy for moving through lessons. The strategy is made by selecting one choice from each of the categories. For example, TVSMED would be "Target only" on initial presentation, "Visual O.K." if user can not perform the auditory only information, "Same group" for the tasks, and "MEDium rate" of progression.

FIG. **17** shows the selection of the level for AV support, as previously described regarding FIG. **7**.

FIG. **18** then asks which of the specific tasks between pretest, preview, training tasks, production tasks, and post-test tasks are desired.

Finally, FIG. **19** allows default settings to be made for each user relating to feedback, tasks, and libraries for AV settings.

It can therefore be seen that a wide variety of flexibility is given to both customize or individualize training for each individual, as well as present different learning strategies for each individual.

N. Operation

The basic components and concepts of system **10** have been provided above. An example of an operation of system **10** will now be set forth.

By referring to FIGS. **2**, **3**, and **20**A–**20**L, initiation and preparation for operation of system **10** can be seen. Initially a user file must be created for each person using system **10**. The operator would access the editor in the software by selecting EDITOR from a menu manager (see FIG. **20**A). A

series of editor menus will appear (FIG. 20B) Key F4 should be selected to add a user. As shown in FIG. 20C, one could copy the user profile for an existing user or by so indicating create a new user profile.

Certain basic information is then entered including user name (FIG. 20D in the preferred embodiment up to eight characters long). Thereafter (FIG. 20E) certain information is then requested. In this Fig., feedback defaults are shown. These can be changed by moving the cursor to those values pressing back space and entering new values or by pressing a space bar to toggle between available settings.

Next the user default screen should be configured (see FIG. 20F). The entries to the questions presented in the user default screen can be answered based on a previously described options that are available for each user. When completed, this user default screen will be preserved for each of the lessons that are built for that user.

Thereafter, a lesson plan is created (see FIG. 20G). This lesson screen can be completed either by (1) selecting existing lesson packages by pressing F5, (2) selecting existing lessons from the lesson library by pressing F2, or by (3) entering new lesson components for task mode, word list, attribute, strategy and starting AV level. Thus up to 15 lessons can be selected and can be either selected by default or customization. As shown in FIG. 20H, if answered YES, the screen of FIG. 20I, for example, would appear which would produce default settings specific to the user and not the existing lesson defaults.

FIG. 20J shows an example of how one would customize a word list.

FIG. 20K shows how one would select a strategy. Again, strategy defines a rate of advancement and direction of movement through specified lessons.

Finally, FIG. 20L, an attribute set can be brought up on the screen and selected for a specific lesson. Only one attribute type per lesson can be chosen.

Other selections would then be made available for customization or default selection:

Starting A/V level: This option specifies the A/V level setting for displaying the stimulus during the training task.

Preview: This YES/NO option controls whether the user is given a preview of the stimuli prior to the training task. This option may be used to insure the stimuli are in the user's vocabulary before entering the task.

Training: This YES/NO option controls whether the user engages in the perception training tasks.

Task Pass Percent: Determines the percent correct needed to pass to next training task. Default value is 75%.

Pretest: This YES/NO option controls whether users are given a pretest before receiving training. Pretest value can be compared with training values and posttest values to document changes.

Posttest: This YES/NO option controls whether the users are given the posttest on completion of training for a lesson.

Reserve Testing Group: This YES/NO option is relevant only if the pretesting and/or posttest option is set to YES and controls whether content used during testing is or is not used during training.

Pretest Judgment: This YES/NO option is relevant only if pretest is selected. It controls whether a score obtained on pretest is used to place the user in a training series. The next two options "advance criteria" and "enter criteria" are used to set values for entering a training series based on the pretest score.

Advance Percentage: This option is relevant only if pretest is selected. The value entered determines when a user advances to the next lesson level. For example, if the value were set to 85% and the user obtained that score or better, the user would advance to the next lesson level for pretest rather than enter the training series.

Enter Percent: Relevant only if pretest is set to YES. The value entered sets the lowest acceptable limit for entering a lesson series. If the user can not obtain this entry score he/she will be moved back to a less difficult lesson level.

Production: A five choice option controls whether the user will be placed in a production task and if so when the production task will be sequenced in the training. Options include "none", "pretest", "posttest", "pre/posttest", and "group based". If "group based" is selected the production task would be given each time the user moves into a new contrast group.

Production A/V Level: This option specifies the A/V level setting for displaying the stimulus during the production task.

Method of Grouping Contrasts From Word Lists: This option controls the way in which groups or stimuli are chosen and contrasts are paired in a lesson. There are four ways of grouping and presentation. A contrast ALWAYS involves a stimulus item from each set. Stimuli within a set are never contrasted. The four choices illustrated below are preceded by an explanation of the terms used.

Training Contrasts: This option specifies a number of contrasts to be presented within a training task.

Reps/Training Contrasts: Option specifies a number of times each contrast is repeated within a training task. The total number of trials presented per task can be determine by multiplying the number of training contrasts with the repetitions per contrast. The total number within a task can not exceed twenty.

Enter the number at the cursor. The backspace or delete keys can be used to erase the current value.

(Trials=)

The number of total trials will appear after training contrasts and repetitions per training contrast have been specified. This value is dynamically derived by multiplying the two contrasts and repetitions. To change this value, one or both of the two preceding parameters must be changed.

Test Contrasts

This option specifies the number of contrasts to be presented within a pretest and/or posttest task.

Enter the number at the cursor. The backspace or delete keys can be used to erase the current value.

Reps/test Contrast

This option specifies the number of times each contrast is repeated within a pretest and/or posttest task. The total number of trials presented per task can be determined by multiplying the number of training contrasts with the repetitions per contrast.

The total number of trials within a task cannot exceed 20.

Enter the number at the cursor. The backspace or delete keys can be used to erase the current value.

Trials=)

The number of total trials will appear after test contracts and repetitions per test contrast have been specified. This

value is dynamically derived by multiplying the contrasts and repetitions.

Enter the number at the cursor. The backspace and delete keys can be used to erase the current value.

Number of Screen Choices

This option specifies the number of answers available during a task. Either a two-choice or four-choice option is available.

Select either "2" or "4" by pressing the space bar.

Retries Per Trial

This option specifies the number of retries or chances the user has to select the correct answer before moving to the next contrast.

Enter the number at the cursor. The backspace or delete keys can be used to erase the current value.

Use Text

This option specifies whether text will be displayed during the task.

Select "Yes" or "No" by pressing the space bar.

Site Group

This optional feature specifies the library number of a special library established for specific site purposes.

Enter the number at this cursor. The backspace or delete keys can be used to erase the current value.

Picture Group

This option specifies which picture libraries should be used to display visual information. The choices are "Standard" "SEE 2", and "Oral". "Standard" refers to illustrated pictures. "SEE2" refers to Signing Exact English sign language and "Oral" refers to presentation of mouth postures. Only one picture group can be chosen per lesson.

Select the choice by pressing the space bar.

Audio Group

Standard English is the only audio group currently available.

Audio Overlay Name

This option allows background noise to be integrated into the audio signal. The default option is to leave the choice blank and have no overlay signal.

Select the overlay name by pressing F2.

Audio Overlay Level

This option controls the level of noise integrated into the audio signal. The value entered can range from 1 to 100, soft to loud.

Enter the number at the cursor. The backspace or delete keys can be used to erase the current value.

Once all of this is set up, the user can go into the lessons. Depending on what has been selected pretesting can be done to determine the position the student should start within the lessons. Once training starts, stimuli are presented according to the settings regarding A/V support, attributes, initial presentation, etc., and the user proceeds by answering, exploring, or discovering as previously discussed. Software constantly monitors the progress of the user and will adjust to his/her performance.

O. Appendices

By referring to FIGS. **21A–21J**, different types of displays and contrast types are shown. Appendix A includes listings of the available lesson packages with one specific example of a lesson package for each of those types of contrasts.

It can be seen that wide variety of difficulty is possible.

Appendix B presents a printout of the menus for software to allow better understanding of the configuration of the software.

Appendix C sets forth examples of rules regarding coding of stimuli.

It is to be understood that this information is submitted in an attempt to disclose one way in which can be realized. The specific software code can be derived from disclosure of this preferred embodiment and is not essential to understanding of the invention. Substantial portion of one example of programming can be found at U.S. copyright registration TX529,929, registered Jul. 27, 1992 to Breakthrough, Inc., and is incorporated by reference herein.

It is to be appreciated that the invention can take many forms and embodiments. True essence and spirit of this invention are defined in the appended claims, and it is not intended that the embodiment of the invention presented herein should limit the scope thereof.

Speech and Nonspeech
N Lesson Packages

Lesson Package: N-SCREEN N1

1. NLU1-1 ..... long uninterrupted v. 1 syl N1
2. NSUE-1 ..... short uninterrupted v. 5 syl sent N1
3. NLUSI-1 ..... long uninterrupted v. short interrupted N1
4. NSUSU-1 ..... short uninterrupted v. short uninterrupted N2

Lesson Package: NONSPCH-1 ..... N3

1. NLU1-1 ..... long uninterrupted v. 1 syl N3
2. NLU1-2 ..... long uninterrupted v. 1 syl N3
3. NLI1-1 ..... long interrupted v. 1 syl N3
4. NLI1-2 ..... long interrupted v. 1 syl N4
5. NSU1-1 ..... short uninterrupted v. 1 syl N4
6. NSU1-2 ..... short uninterrupted v. 1 syl N4
7. NSI1-1 ..... short interrupted v. 1 syl N5
8. NSI1-2 ..... short interrupted v. 1 syl N5

Lesson Package: NONSPCH-2 ..... N7

1. NSUE-1 ..... short uninterrupted v. 5 syl sent N7
2. NSIE-1 ..... short interrupted v. 5 syl sent N7
3. NLUE-1 ..... long uninterrupted v. 5 syl sent N7
4. NLIE-1 ..... long interrupted v. 5 syl sent N8
5. NSUC-1 ..... short uninterrupted v. 3 syl sent N8
6. NSIC-1 ..... short interrupted v. 3 syl sent N8
7. NLUC-1 ..... long uninterrupted v. 3 syl sent N9
8. NLIC-1 ..... long interrupted v. 3 syl sent N9

Lesson Package: NONSPCH-3 ..... N11

1. NLUSI-1 ..... long uninterrupted v. short interrupted N11
2. NLUSU-1 ..... long uninterrupted v. short uninterrupted N11
3. NLISU-1 ..... long interrupted v. short uninterrupted N11
4. NLISI-1 ..... long interrupted v. short interrupted N12

Speech and Nonspeech Lessons

Attribute: Nonspeech/Speech

Pattern Perception

Lesson Package: N-SCREEN

NLU1-1

long uninterrupted v. 1 syl

-mountain-stream	cake
-train-horn	knife
-birds-chirping	moon
-door-creaking	kite
-laughter	mop
-motorcycle	grape
-music	page
-pouring	bowl

NSUE-1

short uninterrupted v. 5 syl sent

-pop-pouring	Get the newspaper
-plane	See my family
-mixer	Watch the butterfly
-cannon-1shot	Get the parachute
-slidewhistle	See my eyelashes
-sneeze	Watch the waterfall
-rollercoaster	Wear the sunglasses
-hairdryer	Get the radio

NLUSI-1

long uninterrupted v. short interrupted

-mountain-stream	-bell
-thunder	-glass-breaking
-door-creaking	-goats
-tapwater	-knocking
-train-horn	-dog-panting
-music	-parking-meter
-traffic	-firecrackers
-baby-crying	-cloth-ripping

Length
L Lesson Packages

Lesson Package: L-SCREEN L1

1. LLU1-1 ..... long uninterrupted v. 1 syl L1
2. LSUE-1 ..... short uninterrupted v. 5 syl sent L1
3. L1E-1 ..... 1 syl v. 5 syl sent L1
4. L13-1 ..... 1 syl v. 3 syl L2
5. LBE-1 ..... 2 syl phrase v. 5 syl sent L2
6. LDE-3 ..... 4 syl sent v. 5 syl sent L2

Lesson Package: LENGTH-1 ..... L3

1. LLU1-1 ..... long uninterrupted v. 1 syl L3
2. LLU1-2 ..... long uninterrupted v. 1 syl L3
3. LLU1-3 ..... long uninterrupted v. 1 syl L3
4. LLI1-1 ..... long interrupted v. 1 syl L4
5. LLI1-2 ..... long interrupted v. 1 syl L4
6. LLI1-3 ..... long interrupted v. 1 syl L4
7. LSU1-1 ..... short uninterrupted v. 1 syl L5
8. LSU1-2 ..... short uninterrupted v. 1 syl L5
9. LSU1-3 ..... short uninterrupted v. 1 syl L5
10. LSI1-1 ..... short interrupted v. 1 syl L6
11. LSI1-2 ..... short interrupted v. 1 syl L6
12. LSI1-3 ..... short interrupted v. 1 syl L6

Lesson Package: LENGTH-2 ..... L7

1. LSUE-1 ..... short uninterrupted v. 5 syl sent L7
2. LSIE-1 ..... short interrupted v. 5 syl sent L7
3. LLUE-1 ..... long uninterrupted v. 5 syl sent L7
4. LLIE-1 ..... long interrupted v. 5 syl sent L8
5. LSUC-1 ..... short uninterrupted v. 3 syl sent L8
6. LSIC-1 ..... short interrupted v. 3 syl sent L8
7. LLUC-1 ..... long uninterrupted v. 3 syl sent L9
8. LLIC-1 ..... long interrupted v. 3 syl sent L9

Length Lessons
Attribute Duration
Pattern Perception

Lesson Package: L-SCREEN

LLU1-1

long uninterrupted v. 1 syl

-thunder	comb
-birds-chirping	eyes
-motorcycle	night
-siren	leg
-music	hat
-baby-crying	broom
-train-horn	house
-traffic	sew

LSUE-1

short uninterrupted v. 5 syl sent

-mixer	See my eyelashes
-handsaw	Watch the elephant
-plane	See the magician
-cannon-1shot	Eat the potato
-zipper	Wear the sunglasses
-car-starting	See my typewriter
-hairdryer	Buy the tricycle
-pop-pouring	I want lemonade

L1E-1

1 syl v. 5 syl sent

bath	See my furniture
shoe	Watch the elephant
draw	Eat the hamburger
blow	Get the umbrella
hat	I want lemonade
leg	I eat spaghetti
fire	Wear the sunglasses
snow	See the restaurant

Syllable Number
U Lesson Packages

Lesson Package: U-SCREEN U1

1. U1L3H-1 ..... 1 syl low freq v. 3 syl high freq U1
2. U1B3B-1 ..... 1 syl mixed freq v. 3 syl mixed freq U1
3. U1B2B-2 ..... 1 syl mixed freq v. 2 syl mixed freq U1
4. U1H3H-1 ..... 1 syl high freq v. 3 syl high freq U2
5. U1L2L-3 ..... 1 syl low freq v. 2 syl low freq U2

Lesson Package: SYLNUM-1 ..... U3

1. U1L3H-1 ..... 1 syl low freq v. 3 syl high freq U3
2. U1L3H-2 ..... 1 syl low freq v. 3 syl high freq U3
3. U1H3L-1 ..... 1 syl high freq v. 3 syl low freq U3
4. U1H3L-2 ..... 1 syl high freq v. 3 syl low freq U4
5. U1L2H-1 ..... 1 syl low freq v. 2 syl high freq U4
6. U1L2H-2 ..... 1 syl low freq v. 2 syl high freq U4
7. U1L2H-3 ..... 1 syl low freq v. 2 syl high freq U5
8. U1B3B-1 ..... 1 syl mixed freq v. 3 syl mixed freq U5
9. U1B3B-2 ..... 1 syl mixed freq v. 3 syl mixed freq U5
10. U1H2L-1 ..... 1 syl high freq v. 2 syl low freq U6
11. U1H2L-2 ..... 1 syl high freq v. 2 syl low freq U6
12. U1H2L-3 ..... 1 syl high freq v. 2 syl low freq U6
13. U1B2B-1 ..... 1 syl mixed freq v. 2 syl mixed freq U7
14. U1B2B-2 ..... 1 syl mixed freq v. 2 syl mixed freq U7

Lesson Package: SYLNUM-2 ..... U9

1. U1H3H-1 ..... 1 syl high freq v. 3 syl high freq U9
2. U1H3H-2 ..... 1 syl high freq v. 3 syl high freq U9
3. U1L3L-1 ..... 1 syl low freq v. 3 syl low freq U9
4. U1L3L-2 ..... 1 syl low freq v. 3 syl low freq U10
5. U1H2H-1 ..... 1 syl high freq v. 2 syl high freq U10
6. U1H2H-2 ..... 1 syl high freq v. 2 syl high freq U10
7. U1H2H-3 ..... 1 syl high freq v. 2 syl high freq U11
8. U1L2L-1 ..... 1 syl low freq v. 2 syl low freq U11
9. U1L2L-2 ..... 1 syl low freq v. 2 syl low freq U11
10. U1L2L-3 ..... 1 syl low freq v. 2 syl low freq U12

Syllable Number Lessons
Attribute: Number of Syllables
Pattern Perception

Lesson Package: U-SCREEN

U1L3H-1

1 syl low freq v. 3 syl high freq

robe	wastebasket
bear	parachute
drum	saxophone
nose	grasshopper
lamb	applesauce
mad	spaghetti
red	butterscotch
green	octopus

U1B3B-1

1 syl mixed freq v. 3 syl mixed freq

shave	overalls
toad	ladybug
juice	tablespoon
snail	restaurant
tree	waterski
hill	moccasin
web	icicle
flea	pineapple

U1B2B-2

1 syl mixed freq v. 2 syl mixed freq

wood	button
ring	ostrich
brick	honey
seed	wreath
glass	hammer
drip	lemon
skin	needle
gum	radish

Stress Pattern
T Lesson Packages

Lesson Package: T-SCREEN T1

1. T1E-1 ..... 1 syl v. 5 syl sent T1
2. T2E-1 ..... 2 syl v. 5 syl sent T1
3. T3E-1 ..... 3 syl v. 5 syl sent T1
4. T13-1 ..... 1 syl v. 3 syl T2
5. TBE-1 ..... 2 syl phrase v. 5 syl sent T2
6. TDE-3 ..... 4 syl sent v. 5 syl sent T2

Lesson Package: STRESS-1 ..... T3

1. T1E-1 ..... 1 syl v. 5 syl sent T3
2. T1E-2 ..... 1 syl v. 5 syl sent T3
3. T1E-3 ..... 1 syl v. 5 syl sent T3
4. T1D-1 ..... 1 syl v. 4 syl sent T4
5. T1D-2 ..... 1 syl v. 4 syl sent T4
6. T1D-3 ..... 1 syl v. 4 syl sent T4
7. T1C-1 ..... 1 syl v. 3 syl sent T5
8. T1C-2 ..... 1 syl v. 3 syl sent T5
9. T1C-3 ..... 1 syl v. 3 syl sent T5
10. T1B-1 ..... 1 syl v. 2 syl phrase T6
11. T1B-2 ..... 1 syl v. 2 syl phrase T6
12. T1B-3 ..... 1 syl v. 2 syl phrase T6

Lesson Package: STRESS-2 ..... T7

1. T2E-1 ..... 2 syl v. 5 syl sent T7
2. T2E-2 ..... 2 syl v. 5 syl sent T7
3. T2E-3 ..... 2 syl v. 5 syl sent T7
4. T2D-1 ..... 2 syl v. 4 syl sent T8
5. T2D-2 ..... 2 syl v. 4 syl sent T8
6. T2D-3 ..... 2 syl v. 4 syl sent T8
7. T2C-1 ..... 2 syl v. 3 syl sent T9
8. T2C-2 ..... 2 syl v. 3 syl sent T9
9. T2C-3 ..... 2 syl v. 3 syl sent T9

Stress Lessons
Attribute: Stress Pattern
Pattern Perception

Lesson Package: T-SCREEN

T1E-1
1 syl v. 5 syl sent

small	Get the radio
laugh	Find the dogcatcher
drive	See the bakery
web	Buy the tricycle
swing	Wear the sunglasses
cane	I like bologna
queen	Get the eraser
game	Eat the banana

T2E-1
2 syl v. 5 syl sent

angel	Get the magazine
zebra	I like karate
beaver	See my handlebars
water	Watch the centipede
castle	Wear the suspenders
vampire	Eat the tomato
dipper	I want lemonade
tiger	See my limousine

T3E-1
3 syl v. 5 syl sent

butterfly	Get the envelope
icicle	See my chariot
sandpaper	I like celery
fingernail	See the pyramid
ladybug	Wear the suspenders
jewelry	Get the umbrella
overalls	Watch the buffalo
radio	See the Eskimo

Mixed Sentence
M Lesson Packages

Lesson Package: M-SCREEN **M1**

1. M1E-1 ..... 1 syl v. 5 syl sent M1
2. M2E-1 ..... 2 syl v. 5 syl sent M1
3. M3E-1 ..... 3 syl v. 5 syl sent M1
4. MCE-1 ..... 3 syl sent v. 5 syl sent M2
5. MDE-1 ..... 4 syl sent v. 5 syl sent M2

Lesson Package: MIXSEN-1 ..... **M3**

1. M1E-1 ..... 1 syl v. 5 syl sent M3
2. M1E-2 ..... 1 syl v. 5 syl sent M3
3. M1D-1 ..... 1 syl v. 4 syl sent M3
4. M1D-2 ..... 1 syl v. 4 syl sent M4
5. M1C-1 ..... 1 syl v. 3 syl sent M4
6. M1C-2 ..... 1 syl v. 3 syl sent M4
7. M1B-1 ..... 1 syl v. 2 syl phrase M5
8. M1B-2 ..... 1 syl v. 2 syl phrase M5
9. M1B-3 ..... 1 syl v. 2 syl phrase M5
10. M1B-4 ..... 1 syl v. 2 syl phrase M6
11. M1B-5 ..... 1 syl v. 2 syl phrase M6

Lesson Package: MIXSEN-2 ..... **M7**

1. M2E-1 ..... 2 syl v. 5 syl sent M7
2. M2E-2 ..... 2 syl v. 5 syl sent M7
3. M2D-1 ..... 2 syl v. 4 syl sent M7
4. M2D-2 ..... 2 syl v. 4 syl sent M8
5. M2C-1 ..... 2 syl v. 3 syl sent M8
6. M2C-2 ..... 2 syl v. 3 syl sent M8
7. M2B-1 ..... 2 syl v. 2 syl phrase M9
8. M2B-2 ..... 2 syl v. 2 syl phrase M9
9. M2B-3 ..... 2 syl v. 2 syl phrase M9
10. M2B-4 ..... 2 syl v. 2 syl phrase M10
11. M2B-5 ..... 2 syl v. 2 syl phrase M10

Mixed Words and Sentences Lessons
Attribute Words 1, 2, 3
Words in Sentences

Lesson Package: M-SCREEN

M1E-1
1 syl v. 5 syl sent

goat	I like peppermint
hug	Watch the buffalo
white	Get the umbrella
leaf	See my piano
nut	Watch the butterfly
head	See the bakery
dream	Eat the hamburger
cat	Pet the kangaroo

M2E-1
2 syl v. 5 syl sent

puppet	Wear the jewelry
teacher	Get the newspaper
beaver	Watch the cardinal
saddle	See the factory
giraffe	See the restaurant
city	Eat the hamburger
finger	Watch the gorilla
zipper	See the library

M3E-1
3 syl v. 5 syl sent

furniture	I like karate
sunflower	Watch the somersault
oxygen	See my firecracker
cereal	Watch the woodpecker
dynamite	Get the feather
mechanic	See my limousine
laundromat	Watch the centipede
buttonhole	See the volcano

Different Sentence
D Lesson Packages

Lesson Package: D-SCREEN D1

1. DL11-1 ..... last wd, 1 syl v. 1 syl D1
2. DL22-1 ..... last wd, 2 syl v. 2 syl D1
3. DL33-5 ..... last wd, 3 syl v. 3 syl D1
4. DLV-1 ..... last wd, vowel v. vowel D2
5. DLI-1 ..... last wd, init con v. init con D2
6. DLF-3 ..... last wd, final con v. final con D2

Lesson Package: DIFSEN-1 ..... D3

1. DL11-1 ..... last wd, 1 syl v. 1 syl D3
2. DL11-2 ..... last wd, 1 syl v. 1 syl D3
3. DL11-3 ..... last wd, 1 syl v. 1 syl D3
4. DL11-4 ..... last wd, 1 syl v. 1 syl D4
5. DL11-5 ..... last wd, 1 syl v. 1 syl D4
6. DL11-6 ..... last wd, 1 syl v. 1 syl D4
7. DL11-7 ..... last wd, 1 syl v. 1 syl D5
8. DL11-8 ..... last wd, 1 syl v. 1 syl D5
9. DL11-9 ..... last wd, 1 syl v. 1 syl D5
10. DL11-10 ..... last wd, 1 syl v. 1 syl D6

Lesson Package: DIFSEN-2 ..... D7

1. DL22-1 ..... last wd, 2 syl v. 2 syl D7
2. DL22-2 ..... last wd, 2 syl v. 2 syl D7
3. DL22-3 ..... last wd, 2 syl v. 2 syl D7
4. DL22-4 ..... last wd, 2 syl v. 2 syl D8
5. DL22-5 ..... last wd, 2 syl v. 2 syl D8
6. DL33-1 ..... last wd, 3 syl v. 3 syl D8
7. DL33-2 ..... last wd, 3 syl v. 3 syl D9
8. DL33-3 ..... last wd, 3 syl v. 3 syl D9
9. DL33-4 ..... last wd, 3 syl v. 3 syl D9
10. DL33-5 ..... last wd, 3 syl v. 3 syl D10

All

Different Sentences Lessons:
Attribute: Word 1, 2, 3
Words In Sentences

Lesson Package: D-SCREEN

DL11-1
last wd, 1 syl v. 1 syl

I can tie	It is new
See my wrist	Watch the flame
See the knee	I can sew
He is last	You like pink
I want tea	You can mow
See the ice	Get the cone
See the jaw	I like pie
It is strong	Watch my eyes

DL22-1
last wd, 2 syl v. 2 syl

I am afraid	It is rotten
Pet the zebra	See my guitar
I can juggle	See my cabin
Wear the helmet	It is winter
Eat the olive	It is summer
I want honey	See my rabbit
Eat the biscuit	See my valentine
Get the sandwich	It is purple

DL33-5
last wd, 3 syl v. 3 syl

Eat the potato	See my valentine
Watch the cardinal	Get the radio
Get the eraser	See my submarine
I eat licorice	Wear the sunglasses
Get the telephone	Move his limousine
Watch the woodpecker	See the opposite
I want lemonade	See the engineer
Wear the galoshes	Get the hula-hoop

Same Sentence
S Lessons Packages

Lesson Package: S-SCREEN S1

1. SL13-1 ..... last wd, 1 syl v. 3 syl S1
2. SL11-1 ..... last wd, 1 syl v. 1 syl S1
3. SL22-1 ..... last wd, 2 syl v. 2 syl S1
4. SL33-1 ..... last wd, 3 syl v. 3 syl S2
5. SLV-1 ..... last wd, vowel v. vowel S2
6. SLF-1 ..... last wd, final con v. final con S2

Lesson Package: SAMSEN-1 ..... S3

1. SL13-1 ..... last wd, 1 syl v. 3 syl S3
2. SL13-2 ..... last wd, 1 syl v. 3 syl S3
3. SL13-3 ..... last wd, 1 syl v. 3 syl S3
4. SL13-4 ..... last wd, 1 syl v. 3 syl S4
5. SL13-5 ..... last wd, 1 syl v. 3 syl S4

Lesson Package: SAMSEN-2 ..... S5

1. SL11-1 ..... last wd, 1 syl v. 1 syl S5
2. SL11-2 ..... last wd, 1 syl v. 1 syl S5
3. SL11-3 ..... last wd, 1 syl v. 1 syl S5
4. SL11-4 ..... last wd, 1 syl v. 1 syl S6
5. SL11-5 ..... last wd, 1 syl v. 1 syl S6
6. SL11-6 ..... last wd, 1 syl v. 1 syl S6
7. SL11-7 ..... last wd, 1 syl v. 1 syl S7
8. SL11-8 ..... last wd, 1 syl v. 1 syl S7
9. SL11-9 ..... last wd, 1 syl v. 1 syl S7
10. SL11-10 ..... last wd, 1 syl v. 1 syl S8

Lesson Package: SAMSEN-3 ..... S9

1. SL22-1 ..... last wd, 2 syl v. 2 syl S9
2. SL22-2 ..... last wd, 2 syl v. 2 syl S9
3. SL22-3 ..... last wd, 2 syl v. 2 syl S9
4. SL22-4 ..... last wd, 2 syl v. 2 syl S10
5. SL22-5 ..... last wd, 2 syl v. 2 syl S10
6. SL33-1 ..... last wd, 3 syl v. 3 syl S10

Same Sentences Lessons
Attribute: Word 1, 2, 3
Words In Sentences

Lesson Package: S-SCREEN

SL13-1
last wd, 1 syl v. 3 syl

Eat the bun	Eat the hamburger
Eat the nut	Eat the banana
Find the rope	Find the autograph
Find the cave	Find the triangle
Watch the moose	Watch the elephant
Watch the boat	Watch the butterfly
See the man	See the hospital
See the house	See the library

SL11-1
last wd, 1 syl v. 1 syl

See the jaw	See the ice
See the stone	See the globe
Watch my eyes	Watch my twin
Watch my snake	Watch my knee
See my wrist	See my jaw
See my plate	See my spoon
It is new	It is ice
It is green	It is flat

SL22-1
last wd, 2 syl v. 2 syl

Get the arrow	Get the ladder
Get the fossil	Get the teacher
I can button	I can juggle
I can vacuum	I can zigzag
Eat the biscuit	Eat the cherry
Eat the olive	Eat the sandwich
See the pedal	See the mummy
See the harpoon	See the jungle

AH

Syllables in Words
Y Lesson Packages

Lesson Package: Y-SCREEN Y1

1. Y1L3H-1 ..... 1 syl, low freq v. 3 syl, high freq Y1
2. Y1L3L-1 ..... 1 syl, low freq v. 3 syl, low freq Y1
3. Y1H3H-1 ..... 1 syl, high freq v. 3 syl, high freq Y1
4. Y1H1L-1 ..... 1 syl, high freq v. 1 syl, low freq Y2
5. Y1L1L-1 ..... 1 syl, low freq v. 1 syl, low freq Y2
6. Y1L1L-1 ..... 1 syl, low freq v. 1 syl, low freq Y2

Lesson Package: SYL123-1 ..... Y3

1. Y1L3H-1 ..... 1 syl, low freq v. 3 syl, high freq Y3
2. Y1L3H-2 ..... 1 syl, low freq v. 3 syl, high freq Y3
3. Y1H3L-1 ..... 1 syl, high freq v. 3 syl, low freq Y3
4. Y1H3L-2 ..... 1 syl, high freq v. 3 syl, low freq Y4
5. Y1H2L-1 ..... 1 syl, high freq v. 2 syl, low freq Y4
6. Y1H2L-2 ..... 1 syl, high freq v. 2 syl, low freq Y4
7. Y1H2L-3 ..... 1 syl, high freq v. 2 syl, low freq Y5
8. Y1H2L-4 ..... 1 syl, high freq v. 2 syl, low freq Y5
9. Y1L2H-1 ..... 1 syl, low freq v. 2 syl, high freq Y5
10. Y1L2H-2 ..... 1 syl, low freq v. 2 syl, high freq Y6
11. Y1L2H-3 ..... 1 syl, low freq v. 2 syl, high freq Y6
12. Y2H3L-1 ..... 2 syl, high freq v. 3 syl, low freq Y6
13. Y2H3L-2 ..... 2 syl, high freq v. 3 syl, low freq Y7
14. Y2L3H-1 ..... 2 syl, low freq v. 3 syl, high freq Y7
15. Y2L3H-2 ..... 2 syl, low freq v. 3 syl, high freq Y7

Lesson Package: SYL123-2 ..... Y9

1. Y1B3B-1 ..... 1 syl, mixed freq v. 3 syl, mixed freq Y9
2. Y1B3B-2 ..... 1 syl, mixed freq v. 3 syl, mixed freq Y9
3. Y1B2B-1 ..... 1 syl, mixed freq v. 2 syl, mixed freq Y9
4. Y1B2B-2 ..... 1 syl, mixed freq v. 2 syl, mixed freq Y10
5. Y2B3B-1 ..... 2 syl, mixed freq v. 3 syl, mixed freq Y10
6. Y2B3B-2 ..... 2 syl, mixed freq v. 3 syl, mixed freq Y10

Syllables in Words Lessons
Attribute: Syllable 1, 2, 3
Syllables in Words

Lesson Package: Y-SCREEN

Y1L3H-1
1 syl, low freq v. 3 syl, high freq

robe	wastebasket
bear	parachute
drum	saxophone
nose	grasshopper
lamb	applesauce
mad	spaghetti
red	butterscotch
green	octopus

Y1L3L-1
1 syl, low freq v. 3 syl, low freq

ball	banana
drive	ambulance
jar	bulldozer
bowl	calendar
loud	valentine
mud	elephant
run	violin
zoo	ladybug

Y1H3H-1
1 syl, high freq v. 3 syl, high freq

cake	wastebasket
ice	applesauce
sleep	hospital
feet	dishwasher
peep	tricycle
key	parachute
sit	potato
lake	spaghetti

Consonants in Words
C Lesson Packages

Lesson Package: C-SCREEN C1

1. CIV-1 ..... init con, voiced v. voiceless C1
2. CIM-1 ..... init con, manner v. manner C1
3. CIP-1 ..... init con, place v. place C1
4. CFV-1 ..... final con, voiced v. voiceless C2
5. CFM–1 ..... final con, manner v. manner C2
6. CFP-2 ..... final con, place v. place C2

Lesson Package: CONSON-1 ..... C3

1. CIV-1 ..... init con, voiced v. voiceless C3
2. CIM-1 ..... init con, manner v. manner C3
3. CIM-2 ..... init con, manner v. manner C3
4. CIM-3 ..... init con, manner v. manner C4
5. CIP–1 ..... init con, place v. place C4
6. CIP-2 ..... init con, place v. place C4
7. CIP-3 ..... init con, place v. place C5
8. CIP-4 ..... init con, place v. place C5
9. CIP-5 ..... init con, place v. place C5
10. CIP-6 ..... init con, place v. place C6

Lesson Package: CONSON-2 ..... C7

1. CFV-1 ..... final con, voiced v. voiceless C7
2. CFM-1 ..... final con, manner v. manner C7
3. CFM-2 ..... final con, manner v. manner C7
4. CFM-3 ..... final con, manner v. manner C8
5. CFP-1 ..... final con, place v. place C8
6. CFP-2 ..... final con, place v. place C8
7. CFP-3 ..... final con, place v. place C9
8. CFP-4 ..... final con, place v. place C9

A17

Consonants In Words Lessons
Attribute: Phoneme 1, 2, 3
Features In Words

Lesson Package: C-SCREEN

CIV-1
init con, voiced v. voiceless

bale	pail
dime	time
van	fan
zip	sip
vase	face
bat	pat
beak	peek
dip	tip

CIM-1
init con, manner v. manner

mad	bad
mail	bale
mat	bat
meat	beet
mole	bowl
mud	bud
mug	bug
moat	boat

CIP-1
init con, place v. place

meat	neat
mice	nice
moon	noon
map	nap
ball	doll
big	dig
boat	goat
bun	gun

Vowel
V Lesson Packages

Lesson Package: V-SCREEN V1

1. VHBDMF-1 ..... high back vowel v. mid front dipthong V1
2. VHFDMC-1 ..... high front vowel v. mid central dipthong V1
3. VHBDLF-1 ..... high back vowel v. low front dipthong V1
4. VHBVHF-7 ..... high back vowel v. high front vowel V2
5. VLBDMF-1 ..... low back vowel v. mid front dipthong V2
6. VHBVHB-1 ..... high back vowel v. high back vowel V2

Lesson Package: VOWEL-1 ..... V3

1. VHBDMF-1 ..... high back vowel v. mid front dipthong V3
2. VHBDMF-2 ..... high back vowel v. mid front dipthong V3
3. VHFDMB-1 ..... high front vowel v. mid back dipthong V3
4. VHFDMB-2 ..... high front vowel v. mid back dipthong V4
5. VHBDMC-1 ..... high back vowel v. mid central dipthong V4
6. VHBVMC-1 ..... high back vowel v. mid central vowel V4
7. VHFDMC-1 ..... high front vowel v. mid central dipthong V5
8. VHFDMC-2 ..... high front vowel v. mid central dipthong V5
9. VHFDMF-1 ..... high front vowel v. mid front dipthong V5
10. VHFDMF-2 ..... high front vowel v. mid front dipthong V6
11. VHBDMB-1 ..... high back vowel v. mid back dipthong V6
12. VHBDMB-2 ..... high back vowel v. mid back dipthong V6

Lesson Package: VOWEL-2 ..... V7

1. VHBDLF-1 ..... high back vowel v. low front dipthong V7
2. VHBDLF-2 ..... high back vowel v. low front dipthong V7
3. VHFVLB-1 ..... high front vowel v. low back vowel V7
4. VHFVLB-2 ..... high front vowel v. low back vowel V8
5. VHFVLB-3 ..... high front vowel v. low back vowel V8
6. VHBVHF-1 ..... high back vowel v. high front vowel V8
7. VHBVHF-2 ..... high back vowel v. high front vowel V9
8. VHBVHF-3 ..... high back vowel v. high front vowel V9
9. VHBVHF-4 ..... high back vowel v. high front vowel V9
10. VHBVHF-5 ..... high back vowel v. high front vowel V10
11. VHBVHF-6 ..... high back vowel v. high front vowel V10
12. VHBVHF-7 ..... high back vowel v. high front vowel V10

AA

Vowels In Words Lessons
Attribute: Phoneme 1, 2, 3
Features In Words

Lesson Package: V-SCREEN

VHBDMF-1

high back vowel v. mid front dipthong

food	rain
boot	cake
moon	day
juice	wake
zoo	cage
goose	rake
groom	break
pool	plane

VHFDMC-1

high front vowel v. mid central dipthong

green	white
sneeze	cry
feet	night
teeth	eyes
leaf	knife
cheese	bike
read	dive
wheel	kite

VHBDLF-1

high back vowel v. low front dipthong

goose	cat
pool	bath
shoe	hat
blue	black
food	bat
glue	man
moon	sad
broom	laugh

ATTRIBUTE PRESENTATIONS

Phoneme 1.....the first phoneme of the first syllable in a word

Phoneme 2.....the second phoneme of the first syllable in a word

Phoneme 3.....the third phoneme of the first syllable in a word

Syllable 1....the first syllable of a word, or the first syllable of the first word in a phrase/sentence

Syllable 2....the second syllable of a word, or the second syllable of the first word in a phase/sentence

Syllable 3....the third syllable of a word, or the third syllable of the first word in a phase/sentence

Word 1.....first word in a word/phrase or sentence

Word 2.....second word in a phrase or sentence

Word 3.....third word in a phrase/sentence

Synonym.....a word or phrase with the same meaning

Antonym.....a word or phrase with the opposite meaning

Speech/Non....a descriptor showing whether the stimuli is speech or an environmental sound

Duration.....this display shows the length of the stimuli, it is derived from the number of phonemes and/or the number of environmental descriptors in a stimuli

Syllable #....total number of syllables in a word/sentence... taken from the phonetic text

Stress Pat....taken from syllabic stress information in the phonetic text
- ^ represents primary stress
- ^^ represents secondary stress
- ^^^ represents tertiary stress

Semantic.....a language based category related to the meaning of the words

A21

```
                                Audio Library Editor
Main Menu

F2    Support libraries menu
F3    Create/edit users
F4    Lesson components menu
F10   Exit editor

      Support Libraries Menu

      F2    Create/edit an audio library
      F3    Create/edit a picture library
      F4    Create/edit a stimuli library
      F10   Exit to previous menu

            Audio Library Editor

            F2    Load library
            F3    Create library
            F4    Add/edit menu
            F5    Set group for library
            F7    Examine entries
            F8    Print library
            F9    Save library
            F10   Exit to previous

            F2    Load library

                  Open an Audio Library
                  Which Audio directory?
                  G) eneric
                  L) anguage
                  S) ite

                  Open an Audio Library
                  Please select the library to load.
                  Path: I:\ITS\LIBS\GENERIC
                  Filename: *.ALB

                  Open an Audio Library
                  1      ALB  1862254 10/06/92   4:32P
                  2      ALB  1889447 10/07/92  12:04P

            F3    Create library

                  Create an Audio library
                  Which Audio directory?
                  G) eneric
                  L) anguage
                  S) ite

                  Create an Audio Library
                  Please select the Audio library name.
                  Path: I:\ITS\LIBS\GENERIC
                  Filename: *.ALB

            F4    Add/edit menu

                  Add/Edit Menu
                  F2    Add entry
                  F3    Export entry
                  F6    Delete entry
                  F7    Examine entries
                  F8    Rename entry
                  F10   Exit to previous

                  Select files from the specified library for each of these
                  functions by selecting and tagging from the library
```

Appendix B

B1

```
F5    Set group for library

          Mark this library as belonging to a group.
          Library Group: 0

F7    Examine entries

F8    Print library

          Print Picture lib to printer or file
          Do you want the output to go to a file? (Y/N)?

          Print Picture lib to printer or file
          Please enter an output file name.
          Path:
          Filename:

F9    Save library

          Close Picture library
          Please select a filename to write the library to.
          Path:
          Filename:
```

TOTAL P.04

B2

```
                                    Picture Library Editor
Main Menu

F2    Support libraries menu
F3    Create/edit users
F4    Lesson components menu
F10   Exit editor

      Support Libraries Menu

      F2    Create/edit an audio library
      F3    Create/edit a picture library
      F4    Create/edit a stimuli library
      F10   Exit to previous menu

            Picture Library Editor

            F2    Load library
            F3    Create library
            F4    Add/edit menu
            F5    Set group for library
            F7    Examine entries
            F8    Print library
            F9    Save library
            F10   Exit to previous

            F2    Load library

                  Open an Picture Library
                  Which Picture directory?
                  G) eneric
                  L) anguage
                  S) ite

                  Open an Picture Library
                  Please select the library to load.
                  Path: I:\ITS\LIBS\GENERIC
                  Filename: *.PLB

                  Open an Picture Library
                  1       PLB  670050 03/06/92   4:32P
                  2       PLB  894407 03/07/92  12:04P

            F3    Create library

                  Create a Picture library
                  Which Picture directory?
                  G) eneric
                  L) anguage
                  S) ite

                  Create an Picture Library
                  Please select the Picture library name.
                  Path: I:\ITS\LIBS\GENERIC
                  Filename: *.PLB

            F4    Add/edit menu

                  Add/Edit Menu
                  F2    Add entry
                  F3    Export entry
                  F6    Delete entry
                  F7    Examine entries
                  F8    Rename entry
                  F10   Exit to previous

                  Select  files  from  the  specified  library  for
                  each of these functions by selecting and
                  tagging from the library
```

B3

F7 Export carriers via list

Export a carrier list
@EATTHEBISCUIT
@EATTHEBREAD
@EATTHECHERRY
@EATTHEFRUIT

Export a carrier list
Please enter an output file name.
Path:
Filename:

F5 Set group for library

Mark this library as belonging to a group.
Library Group: 0

F7 Examine entries

List Stimuli library
@EATTHEBISCUIT (Can INS to view entry)
@EATTHEBREAD
@EATTHECHERRY
@EATTHEFRUIT

F8 Print library

Print Stimuli lib to printer or file
Do you want the output to go to a file? (Y/N)?

Print Stimuli lib to printer or file
Please enter an output file name.
Path:
Filename:

F9 Save library

Close Stimuli library
Please select a filename to write the library to.
Path:
Filename:

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```
F2    Add entries via list

      Insert entries from a text file
      Please select the name list to use.
      Path:
      Filename:

      Insert entries from a text file
      1%250 CA     4567  10/13/92  12:22A
      1&    CS     1156  12/22/91  10:02P
      1     CS     6689  06/12/92  07:11P

F3    Add complex via list

      Insert complex entries from a text file
      Please select the name list to use.
      Path:
      Filename:

      Insert complex entries from a text file
      1%250 CA     4567  10/13/92  12:22A
      1&    CS     1156  12/22/91  10:02P
      1     CS     6689  06/12/92  07:11P

F4    Add carriers via list

      Insert carrier entries from a text file
      Please select the name list to use.
      Path:
      Filename:

      Insert carrier entries from a text file
      1%250 CA     4567  10/13/92  12:22A
      1&    CS     1156  12/22/91  10:02P
      1     CS     6689  06/12/92  07:11P

F5    Export entry list

      Export an entry list
      BAY
      BEE
      BLACK
      BLEED

      Export an entry list
      Please enter an output file name.
      Path:
      Filename:

F6    Export complex list

      Export a complex list
      &BEEHIVE
      &BIGBEAR
      &BIGBOX
      &BIGBULL

      Export a complex list
      Please enter an output file name.
      Path:
      Filename:
```

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```
F5    Edit entry

      Edit a Stimuli entry
      @EATTHEBEET
      @EATTHEBREAD
      @EATTHEFRUIT
      @EATTHEGRAPE

      Edit a carrier entry
      Carrier entry: @EATTHEBREAD
      Please select the carrier audio entry
      Audio: &EATTHEBREAD
      Picture: BREAD
      Element 1: EAT
      Element 2: THE
      Element 3: BREAD
      Element 4:
      Element 5:
      Element 6:
      Element 7:
      Element 8:
      Element 9:
      Element 10:

F6    Delete entry

      Delete a Stimuli entry
      @EATTHEBEET
      @EATTHEBREAD
      @EATTHEFRUIT
      @EATTHEGRAPE

F7    Examine entries

      List Stimuli library
      @EATTHEBEET  (Press INS to review entry)
      @EATTHEBREAD
      @EATTHEFRUIT
      @EATTHEGRAPE

F8    Rename entries

      Rename a Stimuli entry
      @EATTHEBEET
      @EATTHEBREAD
      @EATTHEFRUIT
      @EATTHEGRAPE

      Rename a Stimuli entry
      Old entry name: @EATTHEBREAD
      New name of entry: @EATTHECRUST

F9    List load/save

      List Load/Save Menu

      F2    Add entries via list
      F3    Add complex via list
      F4    Add carrier entry via list
      F5    Export entry list
      F6    Export complex list
      F7    Export carriers via list
      F10   Exit to previous
```

B6

```
F4    Add/edit menu

      Add/Edit Menu
      F2    Add entry
      F3    Add complex audio
      F4    Add carrier entry
      F5    Edit entry
      F6    Delete entry
      F7    Examine entries
      F8    Rename entry
      F9    List load/save
      F10   Exit to previous

      F2    Add entry

            Add an entry
            Name of entry:

            Add an entry
            Entry: BEET
                  Please select an audio entry.
            Audio:
            Picture:
            Text:
            Phonetic Text:
            English Text:

      F3    Add complex audio

            Add a complex audio entry
            Name of entry: &

            Add a complex audio entry
            Name of entry: &EATTHEBEET
                  Please select an element one entry.
            Element 1:
            Element 2:
            Element 3:
            Element 4:
            Element 5:
            Element 6:
            Element 7:
            Element 8:
            Element 9:
            Element 10:
            Element 11:
            Element 12:

      F4    Add a carrier entry

            Add a carrier entry
            Name of entry: @

            Add a carrier entry
            Carrier entry: @EATTHEBEET
                  Please select the carrier audio entry.
            Element 1:
            Element 2:
            Element 3:
            Element 4:
            Element 5:
            Element 6:
            Element 7:
            Element 8:
            Element 9:
            Element 10:
```

B7

```
                                    Stimuli Library
Main Menu

F2    Support libraries menu
F3    Create/edit users
F4    Lesson components menu
F10   Exit editor

      Support Libraries Menu

      F2    Create/edit an audio library
      F3    Create/edit a picture library
      F4    Create/edit a stimuli library
      F10   Exit to previous menu

            Stimuli Library Editor

            F2    Load library
            F3    Create library
            F4    Add/edit menu
            F5    Set group for library
            F7    Examine entries
            F8    Print library
            F9    Save library
            F10   Exit to previous

            F2    Load library

                  Open a Stimuli Library
                  Which Stimuli directory?
                  G) eneric
                  L) anguage
                  S) ite

                  Open a Stimuli Library
                  Please select the stimuli library to load.
                  Path: I:\ITS\LIBS\GENERIC
                  Filename: *.SLB

                  Open a Stimuli Library
                  1%250 SLB  30928  12/02/92   4:32P
                  16    SLB  45998  11/23/92  12:04P

            F3    Create library

                  Create a Stimuli library
                  Which Stimuli directory?
                  G) eneric
                  L) anguage
                  S) ite

                  Create a Stimuli Library
                  Please select the stimuli library name.
                  Path: I:\ITS\LIBS\GENERIC
                  Filename: *.SLB
```

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F5 Set group for library

Mark this library as belonging to a group.
Library Group: 0

F7 Examine entries

F8 Print library

Print Audio lib to printer or file
Do you want the output to go to a file? (Y/N)?

Print Audio lib to printer or file
Please enter an output file name.
Path:
Filename:

F9 Save library

Close Audio library
Please select a filename to write the library to.
Path:
Filename:

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Lesson Components Editor

Main Menu

F2 Support libraries menu
F3 Create/edit users
F4 Lesson components menu
F10 Exit editor

Lesson Components Menu

F2 Create/edit AV levels
F3 Create/edit AV level sets
F4 Create/edit attribute sets
F5 Create/edit strategies
F6 Create/edit lessons
F7 Create/edit lesson packages
F8 Create/edit wordlists
F10 Exit to previous menu

F2-AV level Editor

F2 Create AV level file
F3 Select AV level file
F4 Discrimination AV levels
F5 Identification AV levels
F10 Exit to previous

F2 Create AV level file

AV level Editor
Please enter the name of the new file.
Path:
Filename:

F3 Select AV level file

AV level Editor
(Menu listing)

F4 Discrimination AV levels

Discrimination AV levels

F4 Add AV level
F5 Edit AV level
F6 Delete AV level
F7 List AV levels
F10 Exit to previous

F4 Add AV level

Do you want to copy and existing Av level? (Y/N)?

Edit discrimination task parameters

Responses	Yes	Yes	Yes	Yes
Show picture	None	None	None	None
Audio	Always	Always	Always	Always
Text	On demand	None	None	None

B 10

```
F5    Edit AV level

            Edit AV level
            (Menu listing)

            Edit discrimination task parameters
            AV level:
            Responses          Yes   Yes   Yes   Yes
            Show picture       None  None  None  None
            Audio              Always Always Always Always
            Text               On demand None None None

F6    Delete AV level
            (Menu listing)

F7    List AV levels

            (Menu listing)

F5  Identification AV levels

    Identification AV levels

    F4    Add AV level
    F5    Edit AV level
    F6    Delete AV level
    F7    List AV levels
    F10   Exit to previous

    F4    Add AV level

            Do you want to copy and existing AV level? (Y/N)?

            Edit matching task parameters
            STIMULI            Yes   Yes   Yes   Yes
            Stimuli picture    None  None  None  None
            Stimuli audio      Always Always Always Always
            Stimuli text       On demand None None None
            RESPONSES          Yes   Yes   Yes   Yes
            Response picture   None  None  None  None
            Response audio     Always Always Always Always
            Response text      On demand None None None

    F5    Edit AV level

            Edit AV level
            (Menu listing)

            Edit identification task parameters
            AV level: 1
            Edit matching task parameters
            STIMULI            Yes   Yes   Yes   Yes
            Stimuli picture    None  None  None  None
            Stimuli audio      Always Always Always Always
            Stimuli text       On demand None None None
            RESPONSES          Yes   Yes   Yes   Yes
            Response picture   None  None  None  None
            Response audio     Always Always Always Always
            Response text      On demand None None None

    F6    Delete AV level

            (Menu listing)


    F7    List AV levels

            (Menu listing)
```

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F3-AV level set Editor

F2 Create AV level set file
F3 Select AV level set file
F4 Discrimination AV level sets
F5 Identification AV level sets
F10 Exit to previous

F2 Create AV level set file

AV level Editor
Please enter the name of the new file.
Path:
Filename:

F3 Select AV level set file

AV level Editor
(Menu listing)

F4 Discrimination AV level sets

Discrimination AV level sets

F4 Add AV level set
F5 Edit AV level set
F6 Delete AV level set
F7 List AV level sets
F10 Exit to previous

F4 Add AV level set

Do you want to copy and existing AV level set (Y/N)?

Least difficult AV level:
AV level:
AV level:
AV level:
AV level:
AV level:
AV level:
Most difficult AV level:

F5 Edit AV level set

Edit AV level set
Name Description

AV level set:

Least difficult AV level:
AV level:
AV level:
AV level:
AV level:
AV level:
AV level:
Most difficult level:

F6 Delete AV level set

Name Description

F7 List AV level sets

Name Description

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```
F5    Identification AV level sets

      Identification AV level sets

      F4    Add AV level set
      F5    Edit AV level set
      F6    Delete AV level set
      F7    List AV level sets
      F10   Exit to previous

      F4    Add AV level set

            Do you want to copy and existing Av level set?
            (Y/N)?

            Least difficult AV level:
            AV level:
            AV level:
            AV level:
            AV level:
            AV level:
            AV level:
            Most difficult level:


      F5    Edit AV level set

            Edit AV level set
            Name  Description

      F6    Delete AV level set
            Name  Description

      F7    List AV level sets

            Name  Description
```

F4-Create/edit attribute sets

```
F2    Create attribute set file
F3    Select attribute set file
F4    Add attribute set
F5    Edit attribute set
F6    Delete attribute set
F7    List Attribute set
F10   Exit to previous

      F2    Attribute set editor
            Enter the name of the new file
            Path:
            Filename:

      F3    Select attribute set file

      F4    Add attribute set
            Window 1 attribute:
            Window 2 attribute:
            Window 3 attribute:
            Window 4 attribute:

      F5    Edit attribute set
            Length      Length
            Nonspeech   Nonspeech
            Phoneme     Phoneme
            Stress      Stress
            Syl123      Syllable 123
            Sylinsent   Syllables in sentences
            Sylnum      Syllable number
            Word 123    Word 123
                  ...
```

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F5-Create/edit strategies

F2 Create strategy file
F3 Select strategy file
F4 Discrimination strategies
F5 Identification strategies
F10 Exit to previous

F2 Strategy editor
Enter the name of the new file
Path:
Filename:

F3 Select strategy file
Listing of existing files

F4 Discrimination strategies

F4 Add strategy
F5 Edit strategy
F6 Delete strategy
F7 List strategies
F10 Exit to previous

F4 Add a discrimination strategy

Lesson AVL Set:
Maximum Groups to Use:
Starting Group:

Action on Task Success:
Action on Task Failure:

AV Level of Next group on test success relative to starting AV level:

AV Level of Next group on test failure relative to starting AV level:

Task Failures to Previous lesson:
Task Success to next lesson:
Failure Criterion:
Success Criterion:

F5 Edit Strategy
Name Description

F6 Delete Strategy
Name Description

F7 List Strategies
Name Description

F5 Identification strategies

F4 Add strategy
F5 Edit strategy
F6 Delete strategy
F7 List strategies
F10 Exit to previous

B 14

F4 Add an identification strategy

Lesson AVL Set:
Maximum Groups to Use:
Starting Group:

Action on Task Success:
Action on Task Failure:

AV Level of Next group on test success relative to starting AV level:

AV Level of Next group on test failure relative to starting AV level:

Task Failures to Previous lesson:
Task Success to next lesson:
Failure Criterion:
Success Criterion:

F5 Edit Strategy
Name Description

F6 Delete Strategy
Name Description

F7 List Strategies
Name Description

F6-Create/edit lessons

F2 Create lesson file
F3 Select lesson file
F4 Add lesson
F5 Edit lesson
F6 Delete lesson
F7 List lessons
F10 Exit to previous

F2 Lesson Editor
Enter the name of the new file
Path:
Filename:

F3 Select lesson (Select from menu options)

F4 Add lesson (See user default screen)

F5 Edit lesson
Name Description (Select/tag and edit)

F6 Delete lesson
Name Description (Select/tag and delete)

F7 List lesson
Name Description (Menu listing)

F7-Create/edit lesson packages

F2 Create lesson package file
F3 Select lesson package file
F4 Add lesson package
F5 Edit lesson package
F6 Delete lesson package
F7 List lesson packages
F10 Exit to previous

FIG 15

F2 Lesson Editor
Enter the name of the new file
Path:
Filename:

F3 Lesson Package (Select from menu options)

F4 Add lesson package

Lesson 01:
Lesson 02:
Lesson 03:
Lesson 04:
Lesson 05:
Lesson 06:
Lesson 07:
Lesson 08:
Lesson 09:
Lesson 10:
Lesson 11:
Lesson 12:
Lesson 13:
Lesson 14:
Lesson 15:

F5 Edit lesson package

Name Description listed (Select from menu)

F6 Delete lesson package
Name Description (Select/tag and delete)

F7 List lesson package
Name Description (Menu listing)

F8-Create/edit wordlists

Edit Wordlist

Title:

Set 1: Set 2:
Set 3: Set 4:

Contrast Set 1 Contrast Set 2 Contrast Set 3 Contrast Set 4

(Load wordlists by pressing F5;
Pull from libraries by pressing F2;
Select libraries by pressing F3;)

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User Editor

Main Menu

F2 Support libraries menu
F3 Create/edit users
F4 Lesson components menu
F10 Exit editor

User editor

F2 Create user file
F3 Select user file
F4 Add user
F5 Edit user
F6 Delete user
F7 View users
F10 Exit to menu

F2 Create user file

Please enter the name of the new file.
Path:
Filename:

F3 Select user file

Select user file
PRESCHOOL
KINDER-1
1ST-GRADE
STANDARD

F4 Add user

Edit a user
Do you want to copy an existing User (Y/N)?

User ID:

Edit a user
User ID:
Name:
Birthdate: 01/01/00
Group:
Output device:
Report Dir:
Current Lesson: User Defaults: Lessons:
Feedback: Tasks to Feedback:
Puzzle Feedback Before Painting: Painting Time Allowed in Seconds:
Any Try OK: Magic:

F5 Edit a User

F6 Delete user

ABBY
ALICE
BRYCE
DANIEL

Delete user
Are you sure you want to delete XX (Y/N)?

F7 View users

List users
ABBY
BRYCE
DANIEL

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What is claimed is:

1. A system for adaptive learning by an individual user comprising:

a memory device containing data relating to:
user instructions,
normative responses, and
selection presentations;

a control device containing the memory device and a processor;

a user interface including a user perceivable display, a stimuli presentation device, and a tactile selection and input device; and

a software program which includes processing steps to facilitate adaptive learning, the program further comprising:

presenting stimuli to the user through at least one of the stimuli presentation device and the user perceivable display of the user interface, the stimuli presentation device comprising a device which transduces an electrical signal input to the system representing sound into at least one of an actual sound, an analog signal to stimulate a cochlear implant, and an actuation electrical signal to actuate a vibrotactile device,

reading user input in response to said stimuli,

selecting succeeding stimuli based on both a comparison of user responses and normative data and upon a classification of the user responses irrespective of normative data.

* * * * *